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The Impact of Liquidity Risk, Default Risk, and Inflation on the Term Structure of Interest Rates in Jordan

أثر مخاطر السيولة و مخاطر عدم السداد و التضخم على هيكل أسعار الفائدة في الأردن

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Dedication

الإهداء

خير ما أبدأ فيه الكلام هو الحمد و الثناء لله عز وجل... فالحمد لله رب العالمين الذي أعانني على إتمام هذا العمل ...

الحمدلله رب العالمين صاحب العظمة و الكبرياء و الصلاة و السلام على أشرف المرسلين و على آله و صحبه أجمعين ...

أما بعد فأهدي عملي هذا الى كل من ساعدني ... أهدي هذا الجهد المتواضع إلى أبي و أمي

إليكما يا والدي الحبيبان ... يا أعظم و أجمل و أغلى من عرفت في هذه الدنيا ...

أهدي هذه الرسالة لكما لتكون رسالة شكر و عرفان و تقدير لجهودكما التي لا تقدر بكنوز الدنيا كلها ... أسال الله عز وجل أن يطيل في عمركما ، و يبارك في حياتكما ، و أن يعينني على بركما

إلى من حبهم ملأ قلبي و عقلي وو جداني ، إلى إخواني و أخواتي الأحباء يزن و محمد و بيان و فرح ... حماكم الله و رعاكم

إلى من تقصر كلمات الشكر و عبارات الثناء عن الوفاء بحقه ، إلى أستاذي الفاضل الأستاذ الدكتور محمد العجلوني، إليك مني كل الإحترام و التقدير على معروفك الذي لن أنساه ما حييت

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و آخر دعواهم أن الحمد لله رب العالمين... و الصلاة و السلام على سيد المرسلين سيدنا محمد و على آله و صحبه أجمعين و من سار على نهجه إلى يوم الدين

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Abbreviations

ASE: Amman Stock Exchange

BCCFF: Blue Chip Financial Forecast

CBJ**:** Central Bank of Jordan

CD: Certificate of Deposit

CIR: Cox, Ingersoll, and Ross

CMT: Constant Monetary Treasury

CPI: Consumer Price Index

CRSP: Center for Research in Security Prices

DEF: Default Risk Premium

ECB: European Central Bank

EH: Expectation Hypothesis

EMM: Efficient Method of Moments

GDP: Gross Domestic Product

HP: Hodrick Prescott

IFS: International Financial Statistics

IMF: International Monetary Fund

INF: Inflation Risk Premium

JD: Jordanian Dinar

JIBOR: Weighted Average Interest Rate on Loans Between Banks for One Night

JP: John Pierpont

LIBOR: London Interbank Overnight Rate

LSC: Level, Slope, and Curvature

NIPA: National Income and Product Account

NTB: Number of Traded Bonds

NYSE: New York Stock Exchange

PCE: Personal Consumption Expenditure

QE: Quantitative Easing

T.Bill: Treasury Bill

T.Bond: Treasury Bond

TS: Term Structure of Interest Rates

VAR: Vector Autoregression

VIF: Variance Inflation Factor

VTB: Value of Traded Bonds

VWAP: Trade Volume Weighted Average Prices

YTM: Yield To Maturity

English Abstract

Jalabneh, Rawan Najeeb. The Impact of Liquidity Risk, Default Risk, and Inflation on the Term Structure of Interest Rates in Jordan

Department of Finance and Banking

Yarmouk University, 2014

(Supervisor: Prof. Mohamad Ajlouni)

This study aims to investigate the impact of liquidity risk, default risk, inflation on the term structure of interest rates in Jordan expressed by treasury bills, treasury bonds, and JIBOR for the time period of (2000-2012). The study provides a model to find the impact the liquidity risk, default risk, and inflation have on the term structure of interest rates in Jordan. The estimation results show that there is no effect of liquidity risk, default risk, and inflation on the term structure of interest rates. Giving the findings, the study recommends that decision makers must consider issuing bonds to the public as it is considered as a debt instrument to help in financing deficit in Jordan, increasing the efficiency of the capital market, paying more attention to the term structure of interest rates and conducting more research about it.

Keywords: Term Structure of Interest Rates, Liquidity Risk, Inflation, Default Risk, JIBOR.

ملخص الدراسة

جلابنه، روان نجيب. أثر مخاطر السيولة و مخاطر عدم السداد و التضخم على هيكل أسعار الفائدة في الأردن

رسالة ماجستير بجامعة اليرموك، 2014

(اشراف ا.د محمد محمود العجلوني)

هدفت هذه الدراسة إلى التعرف على أثر مخاطر السيولة ومخاطر عدم السداد والتضخم على هيكل أسعار الفائدة في الأردن الذي يعبر عنه أذونات الخزينة وسندات الخزينة و الوسط المرجح لاسعار الفائدة على القروض بين البنوك لليلة واحدة (جايبور) للفترة الزمنية من (2000-2012) . وتقدم الدراسة نموذج لايجاد أثر مخاطر السيولة و مخاطر عدم السداد والتضخم على هيكل أسعار الفائدة في الأردن ، إن النتائج تبين أن لا يوجد هناك أي تأثير من مخاطر السيولة ، مخاطر عدم السداد ، والتضخم على هيكل أسعار الفائدة . نتائج الدراسة توصي صناع القرار إصدار سندات للجمهور حيث أنها تعتبر أداة دين تساعد في تمويل العجز في الأردن ، وزيادة كفاءة سوق رأس المال، واعطاء المزيد من الاهتمام لهيكل اسعار الفائدة وإجراء المزيد من البحوث حول هذا الموضوع.

كلمات مفتاحية: هيكل أسعار الفائدة، مخاطر السيولة ، التضخم ، مخاطر عدم السداد، الوسط المرجح لاسعار الفائدة (جايبور).

Chapter One

Introduction

1-1 Introduction

Forecasting the term structure of interest rates and interest rates which are the most important pieces of information in the international economy, measuring has a meaningful impact on the long-term decisions made by policy makers, such as: investments, long term debt, determination of the cost of capital, measurement of credit risk, valuation of contingent claims as well as pricing, hedging and managing the risk of interest rate derivatives. Furthermore; interest rates are used in the establishment of fiscal and monetary policies. As a result, term structure has long been one of the most popular fields of academic study. Financial economists, market players, and bankers have made a huge effort to find the most accurate term structure models.

The term structure of an interest rate is a relationship between the time to maturity and the yield to maturity (YTM) of a default-free zero-coupon bond at a given point of time. Economists believe that the term structure is driven by the expectations of participants in financial markets. As such, the term structure inherently contains information useful for discovering forecasts of market participants.

If market participants expect rates to fall during economic contractions, they will wish to lock into current higher rates or increase capital gain

prospects via longer term assets. Hence, economic expectations influence investor behavior which, in turn, affects the term structure of interest rates. The latter therefore should contain information which can be used to forecast expected short-run fluctuations of future economic activity.

The ultimate goal of the term structure is to demonstrate how the riskless interest rate will vary in its maturity spectrum. This information simplifies decisions for actors ranging from households to firms, while central banks also benefit from this information. The information also helps households decide whether to choose a varying or fixed interest rate for their mortgage.

Considering interest rate risk; it is important to take into consideration the risk of short, intermediate and long term interest rates. Within the risk of short interest rates, the risk of changes in LIBOR (London Interbank Overnight Rate) , risk of changes in Treasury bill rate, risk of changes in commercial paper, and extensive additional risks related to the short term interest rates are included.

Monetary policy associated with short term assets on long term interest rates affect the rate of investment and economical growth. It is stated that stochastic disturbances in fiscal policies have been the dominant sources of interest rate fluctuations. As an important consequence of a macroeconomic approach, it is demonstrated that in the presence of risk averse speculators, an increase in the variance of government policy has

two possible effects on the variance of interest rates. First: a larger variance in policy will translate to larger variances in rates. Second: by influencing private speculative behavior: the direct effect is strengthening or weakening.

This study aims to investigate the impact of liquidity risk, default risk, inflation on the term structure of interest rates in Jordan expressed by treasury bills, treasury bonds, and JIBOR for the time period of (2000-2012).

1-2 Problems of the Study

Financial risks have a major control on bonds prices and the term structure of interest rates, since these risks have gained an importance in economy it would be feasible to measure the effect of financial risks on the term structure of interest rates, in our study we are measuring the impact of liquidity risk, default risk, and inflation on the term structure of interest rates.

The main questions are: what determines the term structure of interest rates in Jordan, in terms of default, liquidity, and inflation? Which factors of the above mentioned ones mostly affect the term structure of interest rates in Jordan? What explains the behavior of the term structure?

1-3 Importance of the Study

Most recent researches have focused on determining the models of term structure of interest rates. Less attention has been paid toward

measuring the factors affecting the term structure of interest rates, also less studies have paid attention to the term structure in Jordan.

Hence, the importance of this study stems from testing the term structure of interest rates in Jordan as one of a developing country in an emerging economy.

Since the Jordanian economy is moving towards free market economy this may provide opportunities to give the bonds market in Jordan the importance it should have and maybe a chance to issue bonds publically.

The current study is the first in Jordan that attempts to test the term structure of interest rates which allow for examining cross-sectional variation and time series behavior of the term structure in Jordan.

This study covers a time period where the central bank of Jordan witnessed a new system for recording trading transactions since 2002.

1-4 Objectives of the Study

This study aims to investigate the impact of liquidity risk, default risk, inflation on the term structure of interest rates in Jordan expressed by treasury bills, treasury bonds, and JIBOR for the time period of (2000-2012).

1-5 Structure of the Study

This study consists of six chapters as follows: Chapter one presents an introduction that includes significance, objectives and hypothesis of the study. Chapter two provides the theoretical background of the study.

Chapter three, reviews relevant literature and represents a plenty o studies that came into the subject of our study. Chapter four consists of data collection, dependent and independent variables, methodology, and sample of the study, the model and variables used in its measurement. Chapter five includes the results and analysis. Finally chapter six concludes and summarizes the study and suggests some recommendations.

Chapter Two

Theoretical Framework

2-1 Introduction

The aim of this chapter is to provide a presentation of the theories of term structure of interest rates. This chapter also reviews the empirical findings of the previous literature on the term structure theories which predicts the direction of the economy future.

2-2 Term Structure of Interest Rates

Term structure of interest rates refers to the relationship between the yields of bonds with different maturities. When interest rates of these bonds are plotted against their terms, it presents the yield curve.

The term structure of interest rates at any moment contains information regarding interest rates that markets expect to prevail later on. This information is of tremendous interest to financial practitioners and policymakers alike. Policymakers carefully monitor this information to infer market-based expectations of future monetary policy and to gauge the effectiveness of their communications strategy. For practitioners, the availability of accurate interest rate forecasts can be the key to a successful trading strategy (Kim and Orphanides, 2012).

The term structure of interest rates has been explained historically by Hicks (1947) as "spot" and "forward" trading. Spot transactions are due to be executed currently such as the current week in which the transactions are drawn up, and forward transactions are due to be executed entirely at a future date. The rate of interest for a two-year loan is conceived as being compounded out of the "spot" rate for loans of one year and the "forward" rate of interest for one-year loans to be executed at the beginning of the second year.

Economists believe that the term structure is driven by the expectations of participants in financial markets. As such, the term structure inherently contains information useful for discovering forecasts of market participants (Estrella and Hardouvelis, 1991).

If market participants expect rates to fall during economic contractions, they will wish to lock into current higher rates or increase capital gain prospects via longer term assets. Hence, economic expectations influence investor behavior which, in turn, affects the term structure of interest rates.

Term structure has two main fundamentals: interest rates and yield curve (Irturk, 2006).

2-2-1 Interest Rate

Interest rate is the rate which is charged or paid for the use of money. An interest rate is often expressed as an annual percentage of the principal. It is calculated by dividing the amount of interest by the amount of principal. Interest rates often change as a result of inflation and government policies.

Interest rate is pointed out by Keynes in 1936 as "the perspective yield which is defined by him as the perspective returns expected to be obtained from selling the security's output after deducting the running expenses of obtaining that output".

Interest rates have earned a massive importance in economy based on basic points. Firstly, the modern fixed income market includes not only bonds but all kinds of derivative securities sensitive to interest rates. Secondly, interest rates are important in pricing all other market securities since they are used in time discounting. Lastly, on corporate level since most investment decisions are based on some expectations regarding alternative opportunities and the cost of capital, both depend on the interest rates. In time, there will be changes in interest rates or differences between interest rates. Interest rates have some variables which affect the interest rates in time, such as default risk, tax treatment, marketability, term to maturity, call or put features and convertibility (Irturk, 2006).

Interest rate computation is very clear. For example, a payment of $1 which will be made with certainty (risk-free interest rate) at time *t*. If the market price of $1 paid in time t from now is P_0, then we can find the interest rate for time t using the simple discount formula,

$$P_0 = \frac{\$1}{(1+r_t)^t}$$

The interest rate r_t in this formula is known as the pure discount interest rate for time *t*.

2-2-2 Yield Curve

The yield curve is defined as the plot of yields on bonds with different terms to maturity with the same risk profile, liquidity and tax considerations and it describes the term structure of interest rates for particular types of bonds, such as long-term government bonds of 10 years and over (Mishkin, 2001, p.137).

Economists and investors believe that the shape of yield curve reflects the market future expectations about interest rates. There are some different classifications of yield curves. Generally, there are three different yield curves: upward sloping, downward sloping and flat (Mishkin,2001, P.137).

An upward-sloping yield curve suggests that short-term interest rates are expected to rise. An inverted yield curve would imply short-term interest rates are expected to fall. Finally, a flat yield curve suggests that the short-term and long-term interest rates are the same, meaning that rates are not expected to change in the future. If the term structure of interest rates reflects in part the collective inflation expectations or recession, it is intuitive to believe that it must also reflect market participants' assessments of future real economic activity (Estrella and Hardouvelis, 1991).

Since the 1960s, a yield curve in LIBOR is inverted (as measured by the difference between the ten-year and three-month Treasury rates) has proceeded every recession on record (Estrella, 2005). Since the interest rate cycle precedes the business cycle, it is assumed that a positively sloped yield curve is associated with economic expansion, hence growth in real economic activity.

2-3 Theories of the Term Structure of Interest Rates

Historically speaking, the various models are based on leading term structure theories. Economists have developed these theories to explain the shape of the yield curve and to help making decisions about the monetary policy (expansionary or contractionary).

Gibson *et al*., (2001) agree that the term structure of interest rates is mainly explained by three theories, which analyze the relationship between interest rates of various maturities and the value of the term premium. These theories are: the expectations hypothesis, the liquidity preference theory and the preferred habitat theory.

According to Johnson *et al*., (2010) there are mainly four theories with respect to the term structure of interest rates. These theories are expectations hypothesis, liquidity preference theory, market segmentation hypothesis and preferred habitat theory. In the following subsections, the different theories of the term structure of interest rates will be briefly described.

2-3-1 Expectations Hypothesis

The foundation for the expectation hypothesis was originally developed by Hicks (1939) and Lutz (1940), which make it equally as old as the liquidity preference theory, which was also developed by Hicks (1939).

The expectations hypothesis (EH) of the term structure implies that the yield spread between the long rate and short rate is an optimal predictor of future changes in short rates over the life of the “long bond” (Cuthbertson and Bredin, 2000).

The basic idea is that with the expectation of term premium, there should be no expected difference in the returns from holding a long-term bond or rolling over a sequence of short-term bonds. As a result, the long-term interest rate should be an average of future expected short-term interest rates plus a term premium (Dotsey and Otrok, 2008).

Expectation hypothesis intuitively captures what should be considered as normal market behavior. That is, whether or not the market is risk neutral, has perfect expectations, or bonds are perfect substitutes, investors, as well as borrowers/issuers do factor in expectations. For example, if long-term rates were expected to be higher in the future (based perhaps on the expectation of greater economic growth), long-term investors (e.g., life insurance company, pension fund, etc.) would not want to purchase long-term bonds now, given that next period they would be expecting higher yields and lower prices on such bonds (they also would be exposed to possible capital losses if they did buy such bonds and were forced to liquidate them next year). Instead, such investors would invest in short-term securities now, reinvesting later at the expected higher long-term rates. In contrast, borrowers/issuers wishing to borrow long-term would want to sell long-term bonds now instead of later at possibly higher rates. Combined, the decrease in demand for long-term bonds by investors and the increase in the supply of long-term bonds by borrowers would serve

to lower long-term bond prices and increase yields, leading to a positively-sloped yield curve Thus, a salient feature of expectation hypothesis is that it incorporates expectations as an important variable in explaining the structure of interest rates (Johnson *et al.*, 2010).

The term structure under the expectations theory is determined by,

$$R(t,T) = \frac{1}{T-t}\int_t^T E_t(r(s))ds$$

Where R (t,T) is the yield to maturity at time t of a discounted bond (ds), t denotes the starting point, T represents maturity and r(s) represents the short term rate. However; this theory can be divided into four different subcategories which represent four different interpretations of the expectation hypothesis. These interpretations include the naive expectation hypothesis, the local expectation hypothesis, the return to maturity expectations hypothesis and the unbiased expectation hypothesis (Gibson *et al*., 2001), as explained below:

2-3-1-1 Naive Expectation Hypothesis

This hypothesis states that the expected return on any strategy for any holding period is the same. The expected return on any investment should be equivalent between investing in a long term bond and rolling

over a short term period. Therefore; the investor should be indifferent between these two investment's strategies (Gibson *et al*., 2001).

The term structure is determined by,

$$-\frac{\ln B(t,T)}{T-t} = E\left[\frac{1}{T-t}\int_t^T r(s)ds\right]$$

Where, B(t,T) is the price at time t of a discounted bond (ds), t represents time, T represents maturity, and r(s) represents the short term rate.

2-3-1-2 Local Expectation Hypothesis

This hypothesis is similar to the naïve expectation hypothesis; since it suggests that the expected returns on bonds with different maturities should be the same over a short term investment horizon (Gibson *et al*., 2001).

Term structure is determined by,

$$B(t,T) = E\left[e^{-\int_t^T r(s)ds}\,|r(t)\right]$$

Where, B(t,T) is the price at time t of a discounted bond (ds), t represents time, T represents maturity, and r(s) represents the short term rate.

2-3-1-3 Return to Maturity Expectations Hypothesis

This hypothesis states that the expected return on holding any bond until maturity will have the same expected return as rolling over a set of short term bonds. This hypothesis is also known as the Lutz hypothesis (Gibson *et al*, 2001).

Term structure is determined by,

$$\frac{1}{B(t,T)} = E\left[\exp \int_t^T r(s)ds \,|r(t)\right]$$

Where, B(t,T) is the price at time t of a discounted bond (ds), t represents time, T represents maturity, r(s) represents the short term rate, and r(t) is the instantaneous risk-free interest rate.

2-3-1-4 Unbiased Expectation Hypothesis

This hypothesis assumes that the forward rate is equal to the future expected spot rate. The unbiased expectation hypothesis is also known as the Malkiel hypothesis (Gibson *et al*., 2001).

Term structure is determined by,

$$-\ln B(t,T) = \int_t^T E(r(s)ds)$$

Where, B(t,T) is the price at time t of a discounted bond (ds), t represents time, T represents maturity, and r(s) represents the short term rate.

2-3-2 Liquidity Preference Theory

This theory was developed by Hicks (1936). It predicts that a term premium may be obtained by capital invested in long term bonds because bond holders will require compensation for exposure to capital fluctuations (Nelson, 1972). According to the liquidity preference theory, investors are risk averse, prefer short term maturities and will require a premium in order to commit in long term securities (Gibson *et al*., 2001).

According to the liquidity preference theory, investors are risk-averse, tend to prefer short term maturities and will require a premium to engage in long-term lending, borrowers prefer long-term securities and agree to make this premium (Gibson *et al*., 2001).

The expected return from buying and holding strategy will be higher than the expected return for a roll over strategy, the resulting term structure of interest rates should be downward sloping (Gibson *et al*., 2001).

The term structure under liquidity preference theory is given by,

$$R(t,T) = \frac{1}{T-t}\left[\int_t^T E_t(r(s))ds + \int_t^T L(s,T)ds\right]$$

Where L(t,T)>0 denotes the instantaneous term premium at time t for a bond maturing at time T (Gibson *et al,* 2001).

2-3-3 Market Segmentation Theory

This theory is developed by Culberston (1957). Market Segmentation Theory posits that investors and borrowers have strong maturity preferences that they try to attain when they invest in or issue fixed income securities. As a result of these preferences, the financial markets, according to Market Segmentation Theory, are segmented into a number of smaller markets, with supply and demand forces unique to each segment determining the equilibrium yields for each segment. Thus according to Market Segmentation Theory, the major factors that determine the interest rate for a maturity segment are supply and demand conditions unique to the maturity segment (Johnson *et al.,* 2010).

Important to Market Segmentation Theory is the idea of unique or independent markets. According to this theory, the short-term bond market is unaffected by rates determined in the intermediate or long-term markets, and vice versa. This independence assumption is based on the premise that investors and borrowers have a strong need to match the maturities of their assets and liabilities. Moreover, according to Market Segmentation Theory, the desire by investors and borrowers to avoid

market risk leads to hedging practices that tend to segment the markets for bonds of different maturities (Johnson *et al.,* 2010).

2-3-4 Preferred Habitat Theory

This theory was developed by Modigliani and Sutch (1966). It states that market participants are assumed to have preferred maturity ranges but will decide to change their selected habitat if an enough term premium is offered. According to the preferred habitat theory, investors and borrowers have different specific time horizons (Gibson *et al*., 2001).

As an explanation of term structure, the preferred habitat theory would suggest that yield curves are positively sloped if investors, on the average, prefer short-term to long-term investments and borrowers/issuers prefer long to short. A priori, such preferences may be the case. That is, investors may prefer short-term investments given that longer maturity bonds tend to be more sensitive to interest rate changes or because there are more investors in the upper middle-age class (with shorter investment horizons) than in the young adult or middle-age class (with longer horizon periods). Borrowers also may have greater long-term than short-term financing needs and thus prefer to borrow long-term. Hence, one could argue that the yield curve is positively sloped because investors' and borrowers' preferences make the economy poorly hedged. Of course, the opposite case in which investors want to invest more in long-term

securities than short-term and issuers desire more short-term to long-term debt is possible. Under these conditions the yield curve would tend to be negatively sloped (Johnson *et al.,* 2010).

According to Campbell (1995), several studies have confirmed that the term premia is time-varying. This theory also contradicts the empirical findings concerning the formation of the term structure of interest rates. As a result, more advanced theories have been developed in order to give a better description of the term structure.

Term structure under preferred habitat theory is given by,

$$R(t,T) = \frac{1}{T-t}\left[\int_t^T E_t(r(s))ds + \int_t^T L(s,T)ds\right]$$

Where, L(s,T) refers to the risk premium which can take positive, negative or zero values depending on the offer and demand of bonds, R(t,T) is the term structure of interest rates, t represents time, T represents maturity, and r(s) represents the short term rate.

Therefore; the term structure of interest rates can take any form (Gibson *et al.,* 2001).

2-4 Interest Rates in Jordan

Interest rate is the monthly effective rate payment on borrowed money. If the person is a creditor, this will be received. It is expressed as the percentage of the borrowed sum. In modern financial theory, interest rates and their determinants are probably the most computationally difficult part. Although it is hard to compute, the interest rates provide very valuable information to the economists (Irturk, 2006).

Interest rate is the main tool of monetary policy, which is generally conducted by central banks such as the U.S. Federal Reserve (Fed) or the European Central Bank (ECB) (Mathai, 2009, P.46).

The Fed defines monetary policy as the actions it undertakes to influence the availability and cost of money and credit to promote the goals mandated by Congress, a stable price level and maximum sustainable employment. Because the expectations of households as consumers and businesses as purchasers of capital goods exert an important influence on the major portion of spending in the United States, and these expectations are influenced in important ways by the actions of the Fed, a broader definition of monetary policy would include the directives, policies, statements, forecasts of the economy, and other actions by the Fed, especially those made by or associated with the chairman of its

Board of Governors, who is the nation's central banker (Labonte, 2014, P.6).

In the Jordanian economy, during the 1970s and 1980s, the interest rate was completely determined by the Central Bank of Jordan. Since the beginning of the 1990s, interest rates have become almost floated and commercial banks are competing with each other in determining the level of interest rate (Bader and Malawi, 2010).

The explicit mention of monetary stability grants the Central Bank of Jordan (CBJ) a degree of political independence in implementing monetary policy vis-à-vis the government; yet the same law states that the par value of the JD against gold or foreign currency is determined by the Council of Ministers. Given the fixed exchange rate regime pursued by Jordan, the CBJ has little target or goal independence. The law, however, grants the CBJ a higher degree of instrument independence, as it is free to set its discount rate and upper and lower limits for bank borrowing and lending rates and, in the absence of such limits, to make rules and directives to influence interest rate setting and credit expansion (Maziad, 2009).

The interest rate channel is the standard Keynesian channel of monetary transmission. A fall in real interest rates lowers the cost of capital, causing a rise in investment spending, thereby leading to an increase in

aggregate demand and a rise in output. It is the real rather than the nominal interest rate that affects consumer and business decisions. In addition, it is often the real long-term interest rate and not the short-term interest rate that is viewed as having the largest impact on spending. Changes in the short-term nominal interest rate induced by a central bank result in a corresponding change in the real interest rate on both short and long-term bonds owing to nominal price rigidities. Hence, expansionary monetary policy, which lowers the short-term nominal interest rate, also lowers the short-term real interest rate, and this would still be true even in a world with rational expectations. These lower real interest rates then lead to rises in business fixed investment, residential housing investment, consumer durable expenditure, and inventory investment, all of which produce a rise in aggregate output (Poddar *et al.,* 2006).

The (CBJ) influences the Certificates of Deposit (CD) interest rates by varying its offerings of CDs at auction, and this would directly impact retail interest rates in the banking system (Poddar *et al.*, 2006).

The most common type of interest rates in Jordan is the risk free rate, which is the rate on the central bank issues on behalf of the government which are: 1. Treasury Bills. 2. Treasury Bonds. 3. Bonds Guaranteed by Government.

Official government data showed, that the outstanding public external debt stood at the end of August 2013, with about 7.5 billion dinars at the end of August 2013 (Ministry of Finance).

According to the Ministry of Finance Bulletin, the outstanding balance of the external public debt / budget, which does not include the guaranteed external debt of 5.1 billion dinars in August 2013 rose to 7.5 billion dinars in August 2014 (Ministry of Finance).

Government bonds formed the bulk of the value of the external public debt, including the Euro Bond local dollar bills and bonds, amounted to 2.94 billion dinars in August 2014, up from 1.3 billion in August 2013 (Ministry of Finance).

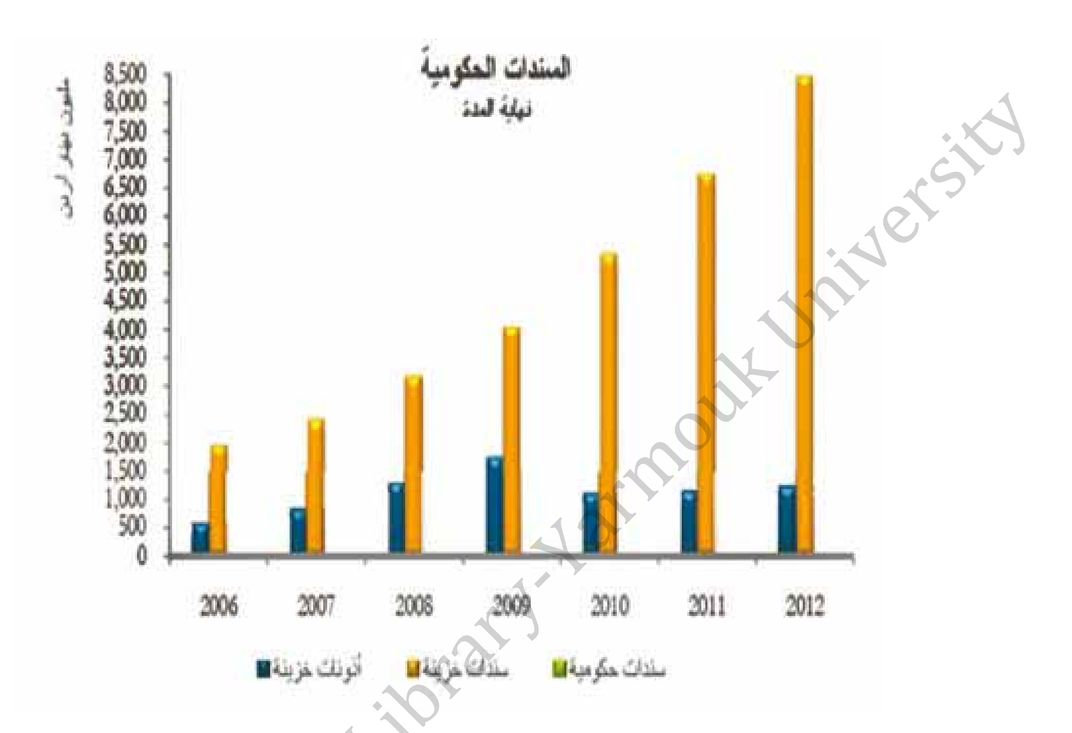
Government issued during the first month of the current year 2014 treasury bonds and bills with a total value of (420) million, including 350 million represents the value of issuance of treasury bonds were subscribed entirely by licensed banks operating in the Kingdom in addition to Treasury Bills worth (50) million dinars during the month of January of 2014, along with the issuance of 20 million dinars worth of government bonds in favor of the Water Authority and recorded interest rate (85.5%) of the repayment period extends for five years to come in versions for government treasury bonds came during the same month by issuing (7) while successive issues were limited issues of Treasury Bills through the issuance of one (Ministry of Finance).

Interest rates on government releases ranged depending on the value of the release on the hand, and according to the maturity period on the other hand, as the higher the value of the issuance and repayment period the higher the interest rate and the lower interest rate in the case of low-value issues and shorten the repayment period, but the general level of interest rates on government bonds and permissions stable compared to the issues recorded during the same months of the year 2013 (Ministry of Finance).

Interest rates on government issues of Treasury bonds during the first month of the year 2014 have noticed relative stability and the amount of interest rate on treasury bonds worth (50) million dinars and the repayment period extends for a period of (2) years on average approximately (3.4%) with average rate of interest on the government bonds worth 50 million dinars and the repayment period extends for a period of (3) on average (77.4%) also reached the interest rate on the government to issue bonds valued at the average price of JD (50) million and the repayment period extends (5) years on average (1.5%) annually (Ministry of Finance).

The year 2012 has recorded the highest rate of interest on government issues, as was (6.8%) annually, one of the highest levels of interest recorded on the issuance of government bonds during the year 2012 prices and interest rates increased by the end of the year 2012 by about

(9.1) percentage points compared with the levels recorded the beginning of the first months of the same year (Ministry of Finance).



Source: www.alrai.com

According to the law of the public debt Minister of finance decides after consultation with the Governor of the Central Bank the plane of annual public debt releases and announcing it and conditions of subscription as may be the same way to make any amendment to this plan and the Minister of Finance determines the terms of issuance of government bonds after consultation with the Governor of the Central Bank, according to the contents of the public Debt Law (Ministry of Finance).

In the same context, the law of public debt authorized the government, upon the recommendation of a committee formed based on the law of borrowing by government bonds, including direct borrowing in the

currency of dinar. The official sources said that borrowing by the value of borrowing by bonds in a currency other than the dinar is included in the outstanding public external debt in case of repayment of the loan value of the currency other than the dinar (Ministry of Finance).

On the level of internal government borrowing, the annual borrowing plan developed by the Ministry of Finance assumed in close coordination with the Central Bank of Jordan to be issued about (2.5) billion dinars internal borrowing from the domestic banking system through the issuance of government bonds (bonds and treasury bills) during the twelve months of the current year (2014) and on batches according to releases issued by the Central Bank of Jordan for the benefit of the public treasury account and direct coordination between the Governor of the Central Bank of Jordan and the Minister of Finance within the ceilings and foundations and conditions contained within the public debt law (Ministry of Finance).

It is noteworthy that the total government bonds that have been issued during the year 2013 amounted to total, about (9.4) billion dinars from last year through (73) issue of treasury bonds, and (9) releases for treasury bills and the monthly average of the releases during the twelve months of the last year, including in average (408) million dinars per month (Ministry of Finance).

In the same context the toll of releases of government securities (bonds and treasury bills) have reached during the whole year 2012 approximately (9.5) billion dinars exceeding the estimates of the expected 2012 budget, which assumed that a total releases (5045) million for the year as a whole (Ministry of Finance).

The value of issuances of government bonds during the year 2013 was about (9.4) billion dinars, while the general budget estimated government bond size, whether bonds or bills treasury, which will be redeemed during the same year about (3613) million in payment of government bonds have been issued during the predecessor years and deserved to be paid during the same year, while the total value of bonds and government permissions that are amortized over the previous year (about 3996) million for the payment of bonds and bills treasury had been issued during the previous years and deserved to be paid during the same year, with the same sources have estimated that the volume of amortization of government bonds during the year 2013 including nearly (3613) million dinars with the same sources estimated the value of the amortization of government bonds during the current year at about 2014 (2.4) billion dinars (Ministry of Finance).

General budget sources have estimated, according to the project of budget law that the cost of interest on government borrowing service (excluding premiums) is estimated at (1.1) billion dinars during the current year 2014

as the general budget has estimated government borrowing on the domestic and external levels, by approximately (1.6) billion dinars and an increase in excess of one billion dinars compared with the year 2013 as it is expected that government borrowing plan to be reflected on the domestic and external levels the high cost of government loans service, whether it be at the level of the high value of the premium loans of payment or at the level of the high interests of repayment in accordance with the repayment schedule as it eats up the value of the government loans interest rates internally and externally more than about 19% of local government revenue amounted to the cost of the interests of public debt over the past year 2013 about 800 million dinars, while expected to be up to about (1.1) billions during the current year 2014, up (37%) and an increase (300) million dinars, compared with the levels recorded during the last year (Ministry of Finance).

2-5 Summary of the Chapter

This chapter has provided an adequate explanation of the term structure of interest rates and its main fundamentals (yield curve and interest rates), then we viewed the main theories that formulated the term structure of interest rates, finally we provided a key information about interest rates in Jordan precisely the main type of interest rates in Jordan which is the risk free rate that is the rate on treasury bills, treasury bonds, and government bonds.

Chapter Three

Literature Review

3.1 Introduction

The objective of this chapter is consistent with the objective of the study which is to find the relationship between term structure of interest rates and default risk, liquidity risk, and inflation rate. So, we will review studies that are relative to the area of this study.

3.2 Previous Studies

1- Doh (2013): *Long-Run Risks in the Term Structure of Interest Rates: Estimation*, the study aims to estimate an equilibrium term structure model using four macro risks: expected consumption growth, expected inflation, consumption volatility, and inflation volatility-drive asset price variation. Depending on the long-run risks model developed by Bansal and Yaron (2004) and Bansal and Shaliastovich (2010), Doh combines persistent fluctuations in consumption growth and inflation with Epstein and Zin (1989) preferences. This combination generates compensation for long-run risks in expected consumption growth, expected inflation, their volatilities, and the short-run unexpected fluctuations in consumption growth and inflation.

Data used is from 1953:Q1 to 2006:Q4. Aggregate consumption growth is from the quarterly National Income and Product Account NIPA

(National Income and Product Accounts) data on nondurables and services. Following Piazzesi and Schneider (2006), the researcher uses the price index for NIPA data. The 3-month Treasury bill rate from the CRSP (Center for Research in Security Prices), Fama risk-free rate file is used for the short-term interest rate, 1-, 2-, 3-, 4-, and 5-year bond yields are extracted from the CRSP Fama-Bliss discount bond files.

The model features Epstein–Zin recursive preferences, which determines the market price of macro risk factors. Agents in the model are assumed to have full information on current and past state variables; an econometrician does not have such knowledge and has to solve a filtering problem to recover state variables from the observed variables. The presence of nonlinearities complicates the filtering problem. However, the model has a linear and Gaussian state space representation once it is condition on a series of stochastic volatilities. Conditional on parameters and regimes governing the variance of innovations, volatilities follow Gaussian processes. Conditional on parameters and volatilities, can be recover the volatility regimes of innovations to stochastic volatility by applying the Hamilton (1989) filter. The researcher uses Bayesian methods that draw parameters, volatilities, and the volatility regimes of innovations to stochastic volatility iteratively. By doing so, it can be characterize the joint posterior distributions of parameters and volatilities.

The researcher found that agents dislike volatility risks and demand a sizable compensation for taking these risks. Unlike the calibration exercises common to the existing literature on long-run risks models, this paper takes the long-run risks model seriously to the time series data of macro variables and nominal bond yields using full information likelihood-based methods. By linking the estimates of volatilities with term premium measures, he found that risk compensation for inflation volatility is central in explaining the time variation of term premia. This finding is consistent with empirical evidence from statistical models and survey data. However, it is different from the emphasis on consumption volatility risk in the existing long-run risks literature based on model calibration.

This paper does not provide an answer to the sources of fluctuations in inflation volatility. While changes in monetary policy can be a potential source, investigating this issue requires endogenizing the inflation process. In addition, a more general specification of shock processes might be necessary to capture the time-varying relationship between consumption risk and inflation risk.

2- Brooks, Cline, and Enders (2012): *Information in the U.S Treasury Term Structure of Interest Rates*. The study aims to examine the information in the U.S. Treasury term structure of interest rates and provide two important contributions to the literature. First extend the

work of Fama (1984a) using constant maturity Treasury data and a common curve fitting procedure based on the work of Nelson and Siegel (1987) and Svensson (1995). Second contribution is found when they extend the period examined in Fama (1984a) through December 2009. Using data from December 1982 through December 2009.

Data used in the analysis that follows consist of the constant maturity Treasury data available from the H 15 file produced by the Board of Governors of the Federal Reserve System. They also compare the results with Fama data available on CRSP. They build a database of monthly discount factors. Their curve-fitting methodology follows Nelson and Siegel (1987) and Willner (1996), which was extended by Svensson (1995). The constant maturity Treasury data starts in January 1962, however, three and six-month rates were unavailable until January 1982. The one-month constant maturity Treasury rate was not provided until July 2001. Because their focus is on the short end of the term structure, they begin the analysis where Fama (1984a) left off in 1982. The lack of three- and six-month constant maturity Treasury restricts from conducting constant maturity Treasury analysis before 1982. They selected December 1982 as s starting point as it excludes observations from Volcker's M1 experiment from October 1979 through October 1982. This starting point also corresponds with approximately the start of federal

funds rate targeting by the Federal Open Market Committee according to Thornton (2006).

They apply a regression approach to measure the information in forward interest rates and introduce both a curve fitting method and an alternative data source. They developed an approach called the LSC model because it estimates for level, slope and curvature. An advantage to this methodology is that the forward-spot differential can be viewed as a combination of information related to the expected change in spot rates and information related to the expected change in the return premium. For a given forward-spot differential, if the expected change in the spot rate increases, then the expected change in the return premium must decrease.

The results presented suggest that forward rates have power to forecast spot rates but not return premiums for recent periods of U.S. Treasury market activity. The forecasting of spot rates appears significant for both the near and long maturities for the most recent ten-year period examined. Most important is the finding that $\beta1$ and $\beta2$ coefficients actually move in opposite directions during this later period. These results contrast with the findings of earlier studies of the term structure, which document that forward rates have power to predict U.S. Treasury bill return premiums for an earlier period.

The study provides an update of important term structure research. As CMT (constant maturity Treasury) data is available for longer maturities

than U.S. Treasury bills and is available on a daily basis, the study lays the groundwork for investigating the information contained in longer maturity forward rates as well as in holding periods shorter than one month.

3- Hordahl and Tristani (2012): *Inflation Risk Premia in the Term Structure of Interest Rates*. The study aims to estimate the size of inflation risk premium in the euro yields and to analyze its relationship to inflation, output and the nominal short-term interest rate. If inflation risk premia were non negligible, break-even inflation rates would no longer present a correct measure of expected future inflation, in such case variations in break-even rates could reflect changes in inflation risk premia over time, and to identify the two theoretical components (the real premium and inflation premium) of a variable, the nominal term premium, which is itself unobservable and obtained through a filtering process.

They extracted data of long-term inflation expectations and premia from the term structure of euro area interest rates (from January 1999 to June 2007) with 102 data points at a monthly frequency. They deal with two main difficulties: first, the possibility that the creation of the single European currency, the euro, induced a structural break in economic relationships; second, the unavailability of accurate bond price data for most European countries before the mid- or even late 1990s. Both

considerations recommend starting their estimation period in January 1999.

They used a model developed by Hordahl, Tristani, and Vestin (2006), which in turns builds on Ang and Piazzesi (2003). More specifically, they price yields based on the dynamics of the short rate obtained from the solution of a linear forward-looking macro model and using an essentially affine stochastic discount factor (Duffie and Kan 1996, Dai and Singleton 2000, Duffee 2002).

Their modeling strategy has the advantage of imposing milder theoretical constraints on risk premia (while remaining highly tractable).

Their approach has the advantage of being independent of special assumptions imposed for analytical tractability, and of relying on a well-established monetary policy transmission mechanism. The drawback is obviously that they are unable to draw a link from the prices of risk to individuals' preferences.

They concluded that that the inflation risk premium on long-term euro area nominal yields has been subject to moderate, but statistically significant fluctuations over the 1999–2007 sample. These fluctuations have been associated partly with small changes in the perceived inflation objective of the European Central Bank, partly to movements in the output gap and, to a lesser extent, to movements in the short-term nominal interest rate. Impulse responses confirm that shocks to the output

gap have the largest and statistically significant impact on the 10-year inflation premium, with the effects being even stronger for inflation premia at shorter horizons.

On average, the 10-year inflation premium was small, around 20 basis points, but significantly different from zero. As a result, the raw break-even inflation rate has often provided inaccurate information on inflation expectations. For the post-2003 period in which reliable break-even data are available, results indicate that increases in the raw break-even rate above 2% have mostly reflected variations in the inflation risk premium, while long-term inflation expectations have remained well anchored. Results suggest that regular monitoring of inflation risk premia is important to understand correctly the information contained in break-even inflation rates.

4- Kim and Orphanides (2012): *Term Structure Estimation with Survey Data on Interest Rate Forecasts*. The study aims to incorporating the information in the surveys of financial market participants' forecasts of a short-term interest rate. The basic idea is that this additional information on the expected short-rate path can help pin down the model parameters pertaining to the physical drift of the state variables underlying the model. Together with the information on the risk-neutral drift of the state variables provided by the cross-sectional dimension of the term structure

data, this should help improve the overall precision of the estimated parameters.

The data used is treasury term structure over the 1990–2003 period; they used monthly data on the 6- and 12-month-ahead forecasts of the 3-month T-bill yield based on the BCFF (Blue Chip Financial Forecasts).

Survey conducted supplementing the term structure data used in conventional estimation with survey forecasts of the 3-month T-bill yield presented in the BCFF publication. The BCFF is published on the 1st day of each month and presents forecasts of financial industry participants and professional forecasters, including banking institutions, conducted a few days earlier. Twice a year, the survey also collects information on long-range forecasts (average expected 3-month T-bill yield between (approximately) the next 6 and 11 years), this information is used to supplement the monthly readings of expectations over shorter horizons.

They used a 3-factor pure-Gaussian model. The model estimated with survey data is also successful in reproducing the well-known pattern of deviation from EH regressions and generates an implied forecast of long-term interest rates that captures some of the deviations of survey forecasts of long-term interest rates from the EH (Expectations Hypothesis) .They also report Monte Carlo evidence that documents the presence of a substantial bias and imprecision in the parameter estimates in the conventional estimation and the improvement brought by the estimation

with survey data. They also compare the use of survey interest rate forecast data and the use of a longer yield sample and find that the use of survey data can be even more effective than the use of a longer sample.

They concluded that conventional estimation of dynamic term structure models that contain a plausible behavior of the long-horizon expectations may face a severe small-sample problem leading to imprecision, bias, and lack of robustness in estimates of objects of economic interest.

They have explored that incorporating the information embedded in survey forecasts of short-term interest rates. With this approach, it can be easy to obtain more reasonable and stable estimation results of the underlying term structure model. Monte Carlo evidence indicates that using survey forecast information can be more effective than using a substantially longer sample. In addition, the analysis highlights features of the survey forecasts that are of interest on their own. the technique of using the information in survey forecasts to help better identify the parameters pertaining to expectations and risk premia can be expected to be useful in other settings as well, such as macro-finance models that examine jointly the dynamics of interest rates and macroeconomic variables, models with stochastic volatility, and so on.

5- Goyenko, Subrahmanyam and Ukhov (2011): *The Term Structure of Bond Market Liquidity and Its Implications for Expected Bond Returns*. The study aims to explore whether illiquidities across the time span (35

years) differentially affected by macroeconomic conditions, and to understand variations in the illiquidity premium across bonds, also to compare time-series determinants of on-the-run and off-the-run illiquidity.

Data set used is the quoted bid and ask prices are from the Center for Research in the CRSP daily Treasury Quotes file from November 1967 to December 2005. The file includes Treasury fixed income securities of 3 and 6 months and 1, 2, 3, 5, 7, 10, 20, and 30 years to maturity. Once issued, the security is considered as on-the-run and the older issues are off-the-run. The proportional quoted spread for the T-bond market, the difference between ask and bid prices scaled by the midpoint of the posted quote, is computed using quoted ask and bid prices for a particular day (using only 2-sided quotes for the calculation). The monthly average spread is computed for each security and then equal weighted across different assets for each month.

Method used is vector autoregression (VAR) analysis, to explore the intertemporal associations between bond illiquidity of different maturities, returns, volatility, and macroeconomic variables that affect bond prices and can have an impact on illiquidity, and determining what forces drive the dynamics of illiquidity of on-the-run and off-the-run issues and what relations hold between the illiquidity of different

maturities and bond returns. They run the analysis separately for on-the-run and off-the-run issues.

They concluded that illiquidity increases in recessions across all maturities. However, the increase is especially pronounced for short-term bonds. The difference between spreads of long- and short-term bonds also increases during recessions for both on-the-run and off-the-run issues. The effect of macro variables on dealer costs is most relevant in the less liquid off-the-run sector. On-the-run illiquidity across all maturities is materially affected only by volatility. However, off-the-run illiquidity is driven by inflation, monetary policy surprises, bond returns, and volatility. Overall, off-the-run illiquidity is affected by a larger set of economic variables than its on-the-run counterpart.

They found that for the overall sample, short-term off-the-run illiquidity forecasts returns across all maturities, but that the return forecasting ability of on-the-run illiquidity is limited. Similar to the effect of stock illiquidity on stock returns, short-term off-the-run illiquidity has a negative contemporaneous impact on bond returns and a positive lag effect. The lag effect persists longer for more illiquid bonds. Consistent with the increasing role of the long bond in the Fed’s policy during recent years, the illiquidity premium emanates from long-term off-the-run illiquidity in the 2nd half of the sample. Results indicate that off-the-run

illiquidity is the primary source of return Forecastability (and thus, the liquidity premium) in the Treasury market.

6- Berardi (2009): *Term Structure, Inflation, and Real Activity*. The study aims to adopt a macroeconomic approach and presents a structural model that allows investigation of the cross sectional restrictions that link the dynamics of the term structure of interest rates to output growth and inflation, and make reliable estimation of the unobservable term structures of real interest rates, expected inflation rates, and inflation risk premia, and generation of endogenous, accurate forecasts of future inflation and gross domestic product (GDP) growth rates.

This paper builds an internally consistent structural model, which provides a bridge between fully specified equilibrium models and nonstructural term structure models with macroeconomic factors, and obtains the term structures of real interest rates and expected inflation rates from observations on nominal bond prices, and it derives endogenous estimates of time-varying bond risk premia using a framework that extends the yield-only approach of Duffee (2002) and Duarte (2004).

The researcher used U.S. quarterly data from the first quarter of 1960 through the fourth quarter of 2005. Bond yields are end-of-quarter annualized zero coupon yields with maturities of 3 months and 1, 3,5, 10, and 20 years. For the period between the first quarter of 1960 and the first

quarter of 1991. The data are taken from McCulloch and Kwon (1993). From the second quarter of 1991 through the fourth quarter of 2005, zero coupon yields are calculated from prices of U.S. Treasury STRIPS (Separate Trading of Registered Interest and Principal of Securities).

As a measure of economic activity, she used seasonally adjusted data on real GDP, expressed in constant dollars, from the U.S. Department of Commerce's Bureau of Economic Analysis. The seasonally adjusted GDP deflator is used as a proxy for the price level.

The researcher estimates an internally consistent structural model that analyzes the relationship between the term structure of interest rates, inflation, and output growth. The equilibrium aspects of the model impose nontrivial restrictions on the joint dynamics of bond yields and macroeconomic variables and imply that real and monetary variables of the economy are interrelated and influence the shape of the yield curve, while bond yields convey information that is useful for forecasting economic fundamentals.

Berardi does not explicitly model money and monetary policy and assume an exogenously given process for the price level. In other words, she assumes that there exists an underlying equilibrium in the money market that supports the observed price level. However, she departs from several models (such as CIR (1985b), PEN (1991), Sun (1992), Ang et al. (2008), and Buraschi and JiUsov (2005)), in allowing a time-varying

central tendency for both the real interest rate and the expected inflation rate variables which allows her to indirectly account for monetary policy in her framework, in that these two variables can be interpreted as proxies for Federal Reserve Board interest rate targets, as in Balduzzi, Das, and Foresi (1995) and Jegadeesh and Pennacchi (1996).

Berardi concludes that that by considering data on inflation and GDP, along with data on yields in an affine term structure setting, one may obtain reliable estimates of the implicit term structures of real interest rates, expected inflation rates, and inflation risk premia, and derive sensible predictions for bond returns, Moreover, the empirical evidence shows that the model generates forecasts of future inflation and GDP growth rates that are considerably more accurate than those produced by several well-known alternative approaches, and it contradicts the notion that the Great Moderation in inflation subsequent to the mid-1980s has induced a deterioration in the forecasting ability of structural models with respect to naive univariate models.

7- Dewachter and Lyrio (2006): *Macro Factors and the Term Structure of Interest Rates*. The study aims to establish a refine model of the term structure of interest rates making use of macroeconomic factors and their long- run expectations. Researchers based their analysis on data from McCulloch and Kwon (1993) and Bliss (1997) provided by Duffee (2002), the data consists of end-of-the-month yields of zero-coupon U.S.

Treasury bonds with maturities of 3 and 6 months and 1, 2, 5, and 10 years. They used a quarterly frequency in order to incorporate the output gap series resulting in a data set with 140 observations (1964:Q1–1998:Q4). The output (GDP) and inflation series are from the International Financial Statistics (IFS) database provided by the International Monetary Fund (IMF). A proxy for the output gap is obtained by using a Hodrick-Prescott (HP) filter on the GDP series. By construction, the long-run expectation of the resulting output gap is equal to zero. Inflation is constructed by taking the yearly percentage change in the CPI index.

The model used in this paper is the model pioneered by Kozicki and Tinsley (2001, 2002) which suggests that the missing factor may be related to the long-run inflation expectation of agents (endpoints). They extend their approach by modeling long-run inflation expectations simultaneously with the term structure and by including time-varying prices of risk specifications. This finding clearly paves the way for a full macroeconomic interpretation of the term structure dynamics. The method improves on the approach taken in the literature to use long-run expectations of macroeconomic variables in order to fit the yield curve. A two-step approach is used where long-run expectations are first filtered from the data using some statistical procedure, and then subsequently used to fit the term structure. A drawback of this method is that not all

available information is used to filter the long-run expectations since only a subset of the data series is used. Another disadvantage is that these filtered expectations are not necessarily consistent with the notion of the expected long-run value. A variable representing long-run expectations should follow a (possibly degenerate) martingale model under the empirical probability measure.

They used an approach related to other papers. In line with Ang and Piazzesi (2003), Bekaert, Cho, and Moreno (2003), Hordahl, Tristani, and Vestin (2003), Kozicki and Tinsley (2001, 2002), and Rudebusch and Wu (2003), they explain the term structure by means of well-defined macroeconomic variables. This paper deviates from the approach taken by Hordahl, Tristani, and Vestin (2003) and Rudebusch and Wu (2003) in that they impose the martingale assumption on the latent macroeconomic variables, which allows them to interpret these factors as long run (limiting) expectations of observable macroeconomic factors. This martingale assumption is in accordance with the models of Kozicki and Tinsley (2001, 2002).Unlike these authors, however, they use a one-step filtering approach by modeling simultaneously the macroeconomic and term structure dynamics within an essentially refine term structure model.

They concluded that four macroeconomic factors model both the term structure as well as the macroeconomic dynamics rather well. While inflation expectations play a crucial role for long-term maturities, actual

macro variables such as inflation and the real interest rate are of primary importance for short-term maturities. This allows interpreting the standard level, slope, and curvature effect factors typically found in the finance literature. They also found that the level factor to be closely linked to the long-run inflation expectation, the slope factor to be an aggregate series for the business cycle condition, and the curvature factor are related to the monetary position of the central bank. Long-run inflation expectations determine to a large extent the level of the prices of risk of all sources of risk. For instance, the price of risk attached to business cycle conditions changes with the level of the long-run inflation expectation. Long-run inflation expectations are, therefore, also a prime determinant of the level of risk premia

8- Chen, Cheng, and Wu (2005): *Dynamic Interactions between Interest Rate, Credit, and Liquidity Risks: Theory and Evidence from the Term Structure of Credit Default Swap Spreads*. The study aims to perform a joint analysis of the term structure of interest rates, credit spreads, and liquidity premia, with a focus on the dynamic interactions between the three sources of risks. The data set includes daily CDS spread quotes on hundreds of corporate companies and across seven fixed maturities from one to ten years for each company.

The CDS data are from JP Morgan Chase. They are daily CDS spread quotes on seven fixed maturities at one, two, three, four, five, seven, and

ten years from May 21, 2003 to May 12, 2004 on each reference company. We obtain the credit rating information on each reference company from Standard & Poor's, and its sector information from Reuters, publicly available on Yahoo.

The data set includes 592 reference companies, 409 of which have the relevant information for credit rating and industry sector available. They classify these companies into two broad industry sectors: financial and corporate. Within each sector, we further classify the companies into five credit rating classes: (1) AA and above, (2) A, including A+ and A-, (3) BBB, including BBB+ and BBB-, (4) BB, including BB+ and BB-, and (5) B and below, the CDS data show substantial differences in updating frequency. Within each industry sector and credit rating class, active quote updates are concentrated on only a few reference companies.

To compare the quoting activity across different firms and during different time periods, they first expand each series into daily frequency by filling missing data points with previously available quotes. Then, they take daily differences. If the quotes are not updated between two consecutive days, the daily differences would be zero. Thus, they use the number of days that have non-zero daily quote differences to capture the quote updating frequency for a certain CDS series during a specific time period.

They perform a joint analysis of the term structure of interest rates, credit spreads, and liquidity premia, with a focus on the dynamic interactions between the three sources of risks. They classify the reference companies into two broad industry sectors, two broad credit rating classes, and two liquidity groups. They develop a class of dynamic term structure models that include (i) two benchmark interest-rate factors to capture the LIBOR and swap rates term structure, (ii) two credit-risk factors to capture the credit swap spreads of high-liquidity group of each industry and rating class, and (iii) both an additional credit-risk factor and a liquidity-risk factor to capture the difference between the high- and low-liquidity groups.

They concluded that credit-risk dynamics differ across different industry sectors and credit rating groups, but in all cases they show intricate interactions with the interest-rate dynamics and liquidity.

Interest-rate factors both affect credit spreads simultaneously, and impact subsequent moves in the credit-risk factors. Within each industry and credit rating class, they also find that the average credit default swap spreads for the high-liquidity group are significantly higher than for the low-liquidity group. Estimation shows that the difference is driven by both credit risk and liquidity differences. The low-liquidity group has a lower default arrival rate and also a much heavier discounting induced by the liquidity risk.

9- Xie, Liu and Wu (2005): *Duration, Default Risk, and the Term Structure of Interest Rates*. The study aims to examine the duration of defaultable bonds by taking into account the interactive effects of default intensity and interest rates; they show that duration for defaultable bonds can be longer or shorter than default-free bonds depending on the relation between default intensity and interest rates.

Data used are obtained from the Lehman Brothers Fixed Income Database distributed by Warga (1998). They first choose Treasury bonds and investment-grade industrial bonds from January 1987 to December 1996 because the number of observations before 1987 is too small. Then, they eliminate from the sample all bonds that were matrix priced rather than trader priced. A matrix price is computed using a proprietary algorithm if a trader price is not available because the bond has not been traded recently. Thus, matrix prices may not reflect economic conditions. They also eliminate all bonds with options (e.g., callable bonds, putable bonds, and bonds with sinking funds), bonds with an odd frequency of coupon payments, floating-rate corporate bonds, government flower bonds, and inflation-indexed government bonds. All bonds not included in the Lehman Brothers Bond Indexes are eliminated as well. This effectively excludes bonds with a maturity of less than one year. Finally, they eliminate bonds in which return data are problematic or pricing errors are abnormally high when priced using the estimated spot curve.

Monthly data for three-month Treasury bill interest rates (from January 1987 to December 1996) are used as a proxy for riskless short rates. Very few zero-coupon bonds exist in our data sample. Thus, they use the Nelson-Siegel procedure to extract spot rates from coupon bonds.

They developed a duration measures based on the Cox-Ingersoll-Ross (1985) interest rate process. They employ a reduced-form approach to derive a closed-form duration model for defaultable bonds by allowing for the effect of stochastic interest rates. An advantage of this model is its ability to infer both the sign and magnitude of default effect on bond duration. Because the duration formula developed from the model has a specific functional form, it can be used to calculate the duration for a particular bond given the parameters of the interest rate process, default intensity, recovery rate, and sensitivity of default intensity to interest rates. In addition, the model provides a convenient framework for estimating the durations of default-free and defaultable bonds from empirical data.

They concluded that the stochastic interest rate process affects the duration measure and that the duration for defaultable bonds could be shorter or longer than their default-free counterparts, depending on the relation between default intensity and interest rates. If the relation is negative, the duration for defaultable bonds is shorter than for default-

free bonds, and vice versa. This finding is contrary to the common belief that default always shortens the bond duration.

They find that default intensity and interest rates exhibit a negative and significant relation for A- and BBB-rated bonds in the 1987–1989 and 1990–1993 subperiods. On the other hand, this relation becomes positive in the 1994–1996 subperiod for all bonds. Results suggest that the relation between default intensity and interest rates varies with the business cycle.

Empirical results show that default-adjusted duration measures are often considerably lower than the Macaulay duration measures. Using the Macaulay measure or any other traditional duration measures unadjusted for default risk and interest rate uncertainty leads to a biased estimate of duration. This problem is more serious for lower grade bonds.

10- Bansal, Tauchen and Zhou (2003): *Regime-Shifts, Risk Premiums in the Term Structure, and the Business Cycle.* The study aims to account for the predictability evidence from the perspective of latent factor term structure models because it is important to focus on the predictability issue when evaluating the plausibility of various term structure models. The predictability evidence, in conjunction with the transition dynamics constitutes a sufficiently rich set of data-features to discriminate across alternative term structure models and to evaluate their plausibility.

The data set is monthly, June 1964 to December 2001, bond yield data obtained from the CRSP. There are total 451 monthly observations, with eight maturities 1, 3, 6, month and 1, 2, 3, 4, 5 years.

The data period 1964-2001 contains six major recessions and six major expansions, which provides potential economic motivation for incorporating regime shifts.

They used the Efficient Method of Moments (EMM), developed in Bansal *et al.* (1995) and Gallant and Tauchen (1996). Tests of over-identifying restrictions based on the EMM method provide a way to compare different, potentially non-nested models. This estimation technique forces the model to confront several important aspects of the data, such as the conditional volatility and correlation across different yields. The empirical evidence suggests that the benchmark CIR (Cox, Ingersoll and Ross 1985) and affine model specifications with up to three factors are sharply rejected with p-values of zero. The only model specification that finds support in the data (with p-value of 1%) is the preferred two-factor regime switching model where the market prices of risks depend on regime shifts. the diagnostics of the various models show that the their preferred regime shifts model specification produces the smallest cross-sectional pricing errors across all the specifications considered in the paper. Using reprojections they compute the conditional correlations and volatility under the null of the various models.

They concluded that Regime switching and the risk premium for holding bonds appear closely connected, they show that the main channel that the regime shifts model accommodates is a time-varying " beta" with respect to risk factors. The empirical evidence indicates that of the considered models, only the regime switching model can account for the size of the predictability (i.e., high $R2$'s) and the tent-shape structure of regression coefficients in the generalized Expectations Hypothesis regressions of excess bond returns on forward rates (Cochrane and Piazzesi, 2002). It is also able to account for the conditional volatility and conditional cross-correlation across yields. They find that there is an intimate link between business cycles, the slope of the yield curve, expected excess return of bond, and the regimes extracted from our term structure model.

11- Barr and Campbell (1997): *Inflation, Real Interest Rates, and the Bond Market: A Study of UK Nominal and Index-Linked Government Bond Prices*. The study aims to break the code of the unobservable expectations of asset holders and reveal them n the coded form of observable prices by building a model to convert the prices of nominal and index- linked UK government bonds into implied expectations of future real inertest rates and inflation.

They used end of month data supplied by the bank of England for nominal and index-linked bonds (January 1985- October 1994). For each month the data on conventional bonds include all those bonds used

contemporaneously by the bank to construct its own yield curve. A number of bonds every month trade "off the curve" as a result of the differential tax treatment of capital gains and coupon income, or liquidity premia. The maximum number of conventional bonds used in any month is 46 from a total of 81 and the minimum is 25 from a total of 50, on average cross month they used 36 bonds out of 67. The proportion of bonds used each month ranges from 45% to 59% with a mean of 53%. All the variable index- linked bonds are used each month; the range is 10 to 14 with a mean of 12. They also include one and three month interbank rates because the number of short maturity (less than on year) conventional bonds and bills in the UK market is very small.

Long maturity index-linked bonds contain little information about medium term real interest rates and there were no index- linked bonds of medium maturity in the first few years after marketable index-linked were introduced in 1981.

They begin the estimation in January 1985, in that month the remaining indexed maturity of the shortest index-linked bond was 2.5 years, while all later months it was less than this, they used 118 months of cross sectional data.

They developed a framework relating the prices of government bonds to expected future log real returns and inflation rates, and then they use a specific model of expected bond returns, the log pure expectation

hypothesis, to derive an empirically implementable bond pricing model, that is the simple asset pricing model to convert the prices of nominal and index-linked UK government bonds into implied expectations of future real interest rates and inflation.

They concluded that real interest rates are highly variable at short horizons but display very little variation at long horizons; almost 80% of the movement of long term nominal rates appears to be due to changes in expected long term inflation. Changes in short horizons real rates and expected inflation are negatively correlated, but the correlation decays towards zero as the horizon increases. Conversely, the levels of real rates and expected inflation exhibit positive correlation that increases with horizon.

Better inflation forecasts can be obtained from nominal interest rates. Forecast equations using expected inflation fit actual inflation better and unlike the equations based on nominal rates are consistent with the expectation hypothesis of the term structure.

12- **Mishkin (1990):** *The Information in the Longer Maturity Term Structure about Future Inflation.* The study aims to examine the information in the term structure of nominal interest rates about future inflation and the term structure of real interest rates.

Data used from 1953 to 1987 for inflation rates and interest rates on one-through five-year Treasury bonds. The inflation and interest rate data are

all in percent at an annual rate. The inflation data are calculated from a CPI (consumer price index) series that appropriately treats housing costs on a rental-equivalence basis throughout the sample period.

The interest rate data are McCulloch's (1987) zero coupon yield curve series that are continuously compounded, end-of-month data. Because interest rate data for longer term bonds must be obtained by fitting a yield curve through interest rates on the maturities available and then using the fitted values for the desired maturity dates, it is worthwhile checking whether results are robust to a different procedure for constructing the data set.

The researcher developed an equation to examine information in the term structure about future inflation. The empirical analysis in the paper primarily focuses on estimation of inflation- change.

In the equation, the change in the future m-year inflation rate from the one-year future inflation rate is regressed on the one-year future inflation rate is regressed on the "slope" of the term structure, the spread between the m-year interest rate and one-year interest rate.

Mishkin concluded that there is substantial information in the longer maturity term structure about future inflation: the slope of the term structure does have a great deal of predictive power for future changes in inflation. These results are consistent with those in Fama (1990) who also finds that at longer maturities the term structure helps forecast future

inflation. On the other hand, at the longer maturities, the term structure of nominal interest rates contains very little information about the term structure of real interest rates. For very short-term maturities (six months or less), for maturities of six months or less, the term structure contains no information about the future path of inflation, but it does contain a great deal of information about the term structure of real interest rates.

Term structure can be used to help assess future inflationary pressures: when the slope of the term structure steepens, it is an indication that the inflation rate will rise in the future and when the slope falls, it is an indication that the inflation rate will fall.

The results lend support to research that has used the term structure spread between long- (over two years) and short-term interest rates to assess the credibility of anti-inflation policies.

3.3 Summary of Literature Review

Table (3-1) provides a short summary for each study reviewed in thic chapter.

Table (3-1) Summary of the Previous Studies

Author(s)	Data	Findings
Doh (2013)	Aggregate consumption growth from the quarterly (NIPA) from 1953:Q1 to 2006:Q4	- Agents dislike volatility risks and demand a sizable compensation for taking these risks. - Risk compensation for inflation volatility is central in explaining the time variation of term premia. - A more general specification of shock processes might be necessary to capture the time-varying relationship between consumption risk and inflation risk.
Brooks, Cline, and Walter	constant maturity Treasury data produced by the Board of Governors of the Federal	- Forward rates have power to forecast spot rates but not return premiums for recent periods of U.S. Treasury market activity.

(2012)	Reserve System from January 1962 to January 1982	- The forecasting of spot rates appears significant for both the near and long maturities for the most recent ten-year period examined.
Hordahl and Trstani (2012)	long-term inflation expectations and premia from the term structure of euro area interest rates (from January 1999 to June 2007) with 102 data points at a monthly frequency	- Inflation risk premium on long-term euro area nominal yields has been subject to moderate, but statistically significant fluctuations over the sample period. - The raw break-even inflation rate has often provided inaccurate information on inflation expectations.
Kim and Orphanides (2012)	treasury term structure over the 1990–2003 period based on the (BCFF)	- Estimation of dynamic term structure models that contain a plausible behavior of the long-horizon expectations may face a severe small-sample problem leading to imprecision, bias, and lack of robustness in estimates of objects of economic interest. - Incorporating the information embedded in survey forecasts of short-term interest rates, it can be easy to obtain more reasonable and stable estimation results of the underlying term structure model.
Goyenko, Subrahmanyam, and Ukhov (2011)	the quoted bid and ask prices are from the (CRSP) daily Treasury Quotes file from November 1967 to December 2005.	- Illiquidity increases in recessions across all maturities, especially pronounced for short-term bonds. - Short-term off-the-run illiquidity forecasts returns across all maturities, but that the return forecasting ability of on-the-run illiquidity is limited. - The lag effect persists longer for more illiquid bonds.
Berardi (2009)	U.S. bond yields quarterly data from the first quarter of 1960 through the fourth quarter of 2005.	- Considering data on inflation and GDP, along with data on yields in an affine term structure setting, one may obtain reliable estimates of the implicit term structures of real interest rates, expected inflation rates, and inflation risk premia, and derive sensible predictions for bond returns.
Dewachter and Lyrio (2006)	the data consists of end-of-the-month yields of zero-coupon U.S. Treasury bonds with 140 observations (1964:Q1–1998:Q4)	- Inflation expectations play a crucial role for long-term maturities, actual macro variables such as inflation and the real interest rate are of primary importance for short-term maturities. - The level factor to be closely linked to the long-run inflation expectation, the slope factor to be an aggregate series for the business cycle condition, and the curvature factor are related to the monetary position of the central bank. - Long-run inflation expectations determine to a large extent the level of the prices of risk of all sources of risk.

Chen, Cheng, and Wu (2005)	They are daily CDS spread quotes on seven fixed maturities at one, two, three, four, five, seven, and ten years from May 21, 2003 to May 12, 2004	- Credit risk dynamics differ across different industry sectors and credit rating groups, but in all cases they show intricate interactions with the interest-rate dynamics and liquidity. - Interest-rate factors affect credit spreads simultaneously, and impact subsequent moves in the credit-risk factors.
Xie, Liu and Wu (2005)	Treasury bonds and investment-grade industrial bonds from January 1987 to December 1996	- Stochastic interest rate process affects the duration measure and that the duration for defaultable bonds could be shorter or longer than their default-free counterparts, depending on the relation between default intensity and interest rates. - Default-adjusted duration measures are often considerably lower than the Macaulay duration measures.
Bansal, Tauchen and Zhou (2003)	Monthly, June 1964 to December 2001, bond yield data obtained from the (CRSP). There are total 451 observations, with eight maturities 1, 3, 6, month and 1, 2, 3, 4, 5 years.	- Regime switching and the risk premium for holding bonds appear closely connected. - only the regime switching model can account for the size of the predictability and the tent-shape structure of regression coefficients in the generalized Expectations Hypothesis regressions of excess bond returns on forward rates
Barr and Campbell (1997)	monthly data supplied by the bank of England for nominal and index-linked bonds (January 1985-October 1994)	- Real interest rates are highly variable at short horizons but display very little variation at long horizons. - Changes in short horizons real rates and expected inflation are negatively correlated. Conversely, the levels of real rates and expected inflation exhibit positive correlation that increases with horizon.
Mishkin (1990)	Data used from 1953 to 1987for inflation rates and interest rates on one-through five-year Treasury bonds	- There is substantial information in the longer maturity term structure about future inflation. - At the longer maturities, the term structure of nominal interest rates contains very little information about the term structure of real interest rates. - For very short-term maturities (six months or less), the term structure contains no information about the future path of inflation, but it does contain a great deal of information about the term structure of real interest rates

Notions:

NIPA: National Income and Product Account.

BCFF: Blue Chip Financial Forecasts.

CRSP: Center for Research in Security Prices.

CD: Certificate of Deposit.

3.4 Distinguishing this Study from Other Studies:

There are many special features that this study would contribute to the literature of the factors affecting term structure of interest rates.

First, it is among the first studies in Jordan that focuses directly on the tem structure of interest rates and main factors affecting it which makes it an important source that provide recommendations that can be used by decision makers.

Second, this study may provide some motivation to issue bonds in Jordan to the public, which might create an active secondary market for bonds in Jordan.

Chapter Four

Data and Research Methodology

4-1 Introduction

This study aims to find the impact of inflation, default risk, and liquidity risk on the term structure of interest rates in Jordan over the period (2000-2012). This chapter presents the methodology used to serve our object in the best possible way.

Section two includes data collection methods. The population is represented in section three. The study sample and the selection criteria are discussed in section four. Section five presents variables of the study. Factors Affecting the Term Structure of Interest Rates and Hypothesis Development are introduced in section six. Finally, Model of the Term Structure of Interest Rates is presented in section seven.

4-2 Data Collection

This study employs time series data analysis. The data for time series data analysis is extracted from Amman Stock Exchange (ASE) website and the central bank website (CBJ) and inflation rates are calculated by Professor Mohammad Ajlouni, based on data extracted from central bank website (CBJ). The data is constructed to cover (2000-2012) period on annual basis.

4-3 Population of the Study

The population of the study includes the Jordanian bonds market that includes treasury bonds, public entities bonds, treasury bills, and corporate bonds. Interest rates on bonds will be extracted for the time period (2000-2012).

Liquidity risk, default risk, and inflation rates will be calculated for the same time period.

4-4 Sample of the Study

The sample of the study consists of treasury bills treasury bonds, and public entities bonds. Corporate bonds will be excluded due to availability issues.

The system used in recording transactions was manual until 2002 which makes collecting data about bonds before 2002 very difficult which force us to eliminate data period for (2002-2012) of interest rates on treasury bills and treasury bonds. Liquidity risk, default risk and inflation rates will be calculated to cover this period as well on annual basis.

4-5 Variables and Measurement:

Variables of the study are divided into dependent and independent variables are explained below:

4-5-1 Dependent Variables

The dependent variable is the term structure of interest rates which is described by the interest rates on long-term and short-term bonds. In this study we will extract the weighted average interest rate on treasury bills, weighted average interest rate on treasury bonds and the Weighted Average Interest Rates on Interbank (JIBOR).

The formula used in calculating the weighted average interest rate on the bonds is

$$= \left(interest\ rate\ on\ the\ first\ issue\left(\frac{the\ amount\ of\ the\ first\ issue}{total\ amount\ of\ issues\ in\ that\ year}\right)\right) + \left(interest\ rate\ on\ the\ second\ issue\ \left(\frac{the\ amount\ of\ the\ second\ issue}{total\ amount\ of\ issues\ in\ the\ second\ year}\right)\right) + \cdots + \left(interest\ rate\ on\ the\ n\ issue\ \left(\frac{the\ amount\ of\ the\ n\ issue}{total\ amount\ of\ issues\ in\ N\ year}\right)\right)$$

Where, n is the number of issues during the year and N is the number of years.

1- **Calculating the weighted Average Interest Rate on Treasury Bills**

To calculate the weighted average interest rate on treasury bills we need to calculate the interest rate on every issue for every year, and

then we calculate the weighted average interest rate based on the law above, these calculations are presented in table 4-1. Data on treasury bills are available in appendix 1.

Table (4-1) Weighted Average Interest Rates on Treasury Bills during the Period (2002-2012)

Year	Weighted average interest rates on treasury bills
2002	1.5349
2003	1.2019
2004	1.2701
2005	3.1340
2006	5.3291
2007	4.1645
2008	4.3293
2009	1.8042
2010	1.3722
2011	2.0073
2012	4.7392

Author's Calculations

The table above shows that the year 2006 has the highest rate, because in that year there was a boom in real estate sector which in turn increases the interest rates, the same for year 2012.

2- Calculating the Weighted Average Interest Rate on Treasury Bonds.

Using the formula of calculating the weighted average interest rate on the bonds we calculate the weighted average interest rates as represented in table 4-2. Data on treasury bonds are available on appendix 2.

Table (4-2) Weighted Average Interest Rates on Treasury Bonds during the Period (2002-2012)

Year	Weighted average interest rates on treasury bonds
2002	5.2500
2003	4.4867
2004	6.2600
2005	7.3140
2006	7.7866
2007	7.5009
2008	7.5373
2009	5.5040
2010	4.4866
2011	5.7176
2012	7.3354

Author's Calculations

Rates from 2004- 2008 have a noticeable increase since the inflation rates witnessed an increase during that period, which forced interest rates to increase, the same for year 2012.

3- The Weighted Average Interest Rates on Interbank (JIBOR).

Table (4-3) JIBOR during the Period (2002-2012)

JIBOR	Month	Year
2.88	12	2002
2.12	12	2003
2.805	12	2004
4.629	12	2005
6.495	12	2006
5.147	12	2007
4.649	12	2008
2.645	12	2009
2.15	12	2010
2.917	12	2011
4.309	12	2012

Source: www.cbj.gov.jo

As noticed from the table above that year 2006 has the highest rate since Jordan noticed a huge increase in interest rates that year.

4-5-2 Independent variables

The independent variables of the study are liquidity risk, default risk and inflation are explained below:

1- Liquidity Risk

A security whose lowest returns tend to accompany unfavorable shifts in that welfare must offer additional compensation to investors for holding the security. Liquidity appears to be a good candidate for a priced state variable. It is often viewed as an important feature of the investment environment and macroeconomy, and recent studies find that fluctuations in various measures of liquidity are correlated across assets (Pastor and Stambaugh, 2003).

Investors might require higher expected returns on assets whose returns have higher sensitivities to aggregate liquidity. For example, any investor who employs some form of leverage and faces a margin or solvency constraint, in that if his overall wealth drops sufficiently he must liquidate some assets to raise cash. If he holds assets with higher sensitivities to liquidity, then such liquidations are more likely to occur when liquidity is low, since drops in his overall

wealth are then more likely to accompany drops in liquidity. Liquidation is costlier when liquidity is lower, and those greater costs are especially unwelcome to an investor whose wealth has already dropped and who thus has higher marginal utility of wealth. Unless the investor expects higher returns from holding these assets, he would prefer assets less likely to require liquidation when liquidity is low, even if the latter assets are just as likely to require liquidation on average (Pastor and Stambaugh, 2002).

Liquidity is measured among researchers with many measures, (Sarr and Lybek, 2002) used four categories to specify liquidity of the security: (i) transaction cost measures that captures costs of trading financial assets and trading frictions in secondary markets, (ii) volume-based measures that distinguish liquid markets by the volume of transactions compared to the price variability, primarily to measure depth and breadth, (iii) equilibrium-price based measures that try to capture orderly movements towards equilibrium prices to mainly measure resiliency, (iv) market-impact measures that attempt to differentiate between price movements due the degree of liquidity from other factors, such as a general market conditions or arrival of new information to measure both elements of resiliency and speed of price discovery.

Fleming (2003) used in measuring liquidity of the US treasury market trading volume, trading frequency, bid-ask spreads, quote sizes, trade sizes, price impact coefficients, and on-the-run/off-the-run yield spreads. The variables are analyzed relative to one another, across securities, and over time in an effort to assess how liquidity can best be measured and tracked.

Muranaga and Ohsawa (2008), they first used a modified measure for market risk that takes into account intraday tick-by-tick price movement which reflects intraday liquidity patterns. They checked whether opening sessions of the Tokyo Stock Exchange (TSE), where actual trading is at its most active and significant quantities of trades of less liquid equities take place, also exhibit higher volatility and kurtosis, as evidenced for the New York Stock Exchange (NYSE). Second, they introduce the notion of "trade volume-weighted average prices (VWAP)" and construct a market risk measure reflecting the daily volatility of VWAP and intraday histograms of actual trade prices which clearly display the risk of deviating from average trade execution performance during a single day.

In this study we will use three measurements of liquidity in the bonds market which are:

A- Value of Traded Bonds

This is the number of bonds traded in the financial market expressed in Jordanian dinar, it can be obtained on a daily basis, monthly basis, and on annual basis. In our study we extract data on annual basis which are extracted from Amman Stock Exchange (ASE) website.

B- Number of Traded Bonds

It is the number of bonds traded in the market during the day, month or year (in here we are using annual data).

C- Closing Price

It is the price of a bond at the end of the day's business in a financial market.

In our study the closing price is calculated using the following formula:

$$closing\ price = \frac{value\ of\ traded\ bonds\ (JD)}{number\ of\ traded\ bonds}$$

This formula can be used to calculate closing price for bonds on different basis but since we are adopting annual-based data we will

calculate the closing price annually. The calculations are presented in table 4-4.

Table (4-4) Closing Prices of Traded Bonds during (2002-2012)

Year	closing prices
2002	196.3144
2003	157.4487
2004	582.5066
2005	934.9150
2006	1524.9061
2007	2404.9835
2008	1452.8034
2009	3324.3101
2010	1000.5357
2011	925.0650
2012	-

Source: www.ASE.com.jo

Year 2009 has the highest closing price, because the issues in that year were at its maximum rates.

The data on value and number of bonds are available in appendix 3.

2- Default Risk

Default risk is the uncertainty surrounding a firm's ability to service its debts and obligations. Prior to default, there is no way to discriminate unambiguously between firms that will default and those that will not. At best we can only make probabilistic assessments of the likelihood of default. As a result, firms generally pay a spread over the default-free rate of interest that is proportional to their default probability to compensate lenders for this uncertainty (Crosbie and Kocagil, 2003).

Cross default clauses in debt contracts usually ensure that the default probabilities for each of the classes of debt for a firm are the same. That is, the default probability of the firm determines the default probability for all of the firm's debt or counterparty obligations. However, the loss in the event of default for each of the classes of obligations can vary widely depending on their nature (security, collateral, seniority, etc.) (Crosbie and Bohn, 2003).

Default risk requires the measurement of default correlations. Correlations measure the degree to which the default risks of the various borrowers and counterparties in the portfolio are related (Crosbie and Bohn, 2003).

In our study, Jordanian bonds are backed by the government, which means that it is not defaulted, so we are considering that default risk on bonds in our study equals to zero, But the default risk on JODIBORs is calculated using the following formula:

Default $risk_{Jibor} = JIBOR_{it} - TB_{it}$

Where, JIBOR is the weighted average interest rates on interbank, TB is the weighted average interest rates on treasury bills.

Calculations are represented in table 4-5.

Table (4-5) Default Risk on JIBOR during the Period (2002-2012)

Year	Default risk
2002	1.3451
2003	.9181
2004	1.5349
2005	1.4950
2006	1.1659
2007	.9825
2008	.3197
2009	.8408
2010	.7778
2011	.9097
2012	.4302

Author's Calculations

3- Inflation

Inflation can be defined as a sustained or continuous rise in the general price level or, alternatively, as a sustained or continuous fall in the value of money. Several things should be noted about this definition. First, inflation refers to the movement in the general level of prices. It does not refer to changes in one price relative to other prices. These changes are common even when the overall level of prices is stable. Second, the rise in the price level must be somewhat substantial and continue over a period longer than a day, week, or month (Makinen, 2003).

Rich and Steindel (2007) used consumer price index (CPI) and the personal consumption expenditure (PCE) index to measure the inflation rate in US.

Clark (2001) claimed that two measures of inflation have been used in specifying inflation rate which are: the Consumer Price Index (CPI)

excluding food and energy, the trimmed mean, and the median CPI. Two other measures he examined for the first time in his article: the CPI excluding energy, and the CPI excluding the eight most volatile components of the overall index.

In our study we use Consumer Price Index (CPI) to calculate inflation rates, the rates were calculated by Professor Mohammad Ajlouni considering 2006 as the base year and using data extracted from (CBJ), and can be noticed on table 4-6.

Table (4-6) inflation Rates in Jordan during the Period (2002-2012)

Year	Inflation rate
2002	1.79
2003	1.6
2004	3.35
2005	3.52
2006	6.26
2007	4.7
2008	13.94
2009	-.67
2010	5.06
2011	4.42
2012	4.62

Author's Calculations

The year 2008 has the highest inflation rate due to increasing prices but an increase in demand for goods and services the opposite is reflected in 2009.

4-6 Factors Affecting the Term Structure of Interest Rates and Hypothesis Development

The current study aims to investigate the factors determining the term structure of interest rates in Jordan.

Several studies have investigated the factors that have a direct impact on the term structure of interest rates, Evans and Marshall (1998), studied to what extends movements of the term structure can be explained by exogenous impulses of monetary policy and other macroeconomic variables, as product and inflation. The authors use a VAR model under different identification schemes, as the one popularized by Christiano *et al*. (1996, 1999) and Gal? (1992).

Diebold *et al.* (2005), estimated a model in state-space form for the term structure of interest rate, where the dynamics of the term structure is formulated in terms of non-observable factors (level, declivity and curvature) as well as observable macroeconomic factors (economic activity, stance of monetary policy, inflation, etc.).

Sekkel and Alves (2010) estimated a near – VAR model and found that factors such as monetary policy shocks, country risk, and product and inflation are responsible for an important share of the term structure dynamics.

Chen *et al* (2005), they used a large data set on CDS spread quotes, we perform a comprehensive analysis of the term structure of interest rates, and they confirmed that default risk and liquidity have a major impact on the term structure of interest rates.

Dai and Philipon (2006), they build a model successfully to explain the dynamics of the term structure of interest rates, and deviations from the expectation hypothesis. They specified the government deficit, inflation, real activity as the main factors affecting the term structure of interest rates.

Consistent with the previous studies and the majority of studies in the literature we are considering the default risk, liquidity risk, and inflation as the main factors having an impact on the term structure of interest rates in Jordan.

1- Default risk

We would expect that there is a positive relationship between default risk and the term structure of interest rates which is consistent with Fisher and Guimaraes (2012), the mechanism runs that when real interest rates raise, the opportunity costs to those who buy emerging economies' debt increase, which raises interest rates in emerging economies. This direct effect increases the debt burden on emerging economies, raising the risk that they will default on their debt and requiring emerging economies to offer even higher interest rates in compensation.

Fons (1994) developed a model that shows that the increase in default risk is reflected in higher interest rates at short and long maturities.

H1: Default risk has a significant positive impact on the term structure of interest rates.

2- Liquidity Risk

Liquidity models are especially relevant in light of the recent financial crisis and the non-conventional monetary policy activities utilized by central banks to lower long-term interest rates. This was done via the purchases of long-term government bonds, known as quantitative easing (QE). QE would be ineffective in modifying long-term interest rates if there was no liquidity impact to bond purchases. The evidence supports the existence of such an effect (D'Amico and King (2011), Gagnon et al. (2010), Hamilton and Wu (2012), Jarrow and Li (2012), Li and Wei (2012), Meaning and Zhu (2011), and Wright (2012)).Measuring the impact of quantitative easing is an active area of research, and crucial in this estimating is modeling the liquidity impact of bond purchases on the term structure of interest rates in an arbitrage-free setting (Jarrow and Roch, 2013).

Espinoza *et al.*, (2007) approves that the early literature on the term structure had tried to explain this puzzle by appealing to liquidity or risk. Hicks (1946) emphasized that a risk-averse investor would prefer to lend

short-term, if he was not given any premium on long-term lending, because there is a higher risk that the prices of long-term bonds change. Lutz (1940) suggested that long-term securities are less liquid than short-term ones, where the most liquid asset is money.

H2: Liquidity risk has a significant positive impact on the term structure of interest rates.

3- Inflation

The price of an asset depends on the covariance of its payoff with real consumption growth. In this type of model, prices of nominal assets, such as nominal bonds, will therefore depend in part on the covariance of consumption and inflation. It is the sign of this covariance that determines the sign of the inflation risk premium: if consumption growth covaries negatively with inflation, so that consumption growth tends to be low when inflation is high, then nominal assets are more risky and investors will demand a positive premium to hold them. If, on the other hand, the covariance is positive, then holding nominal assets will partially hedge negative surprises to consumption, and investors would be willing to do so for a lower expected return, implying a negative inflation premium (Hordahl, 2008).

Hordahl (2008) estimates inflation risk premia using a dynamic term structure model based on an explicit structural macroeconomic model , found that inflation risk premia on the term structure is on average

positive, but relatively small. Moreover, the estimated premia vary over time, mainly in response to changes in economic activity, as measured by the output gap, and inflation.

Ang *et al*. (2008) in that the real rate curve is downward sloping. In these regimes, expected inflation is low. The term structure of inflation compensation, the difference between nominal and real yields, is upward sloping. This is due to an upward-sloping inflation risk premium.

H3: Inflation has a significant positive impact on the term structure of interest rates.

4-7 The Model of the Term Structure of Interest Rates

This study investigates the relationship between default risk, liquidity risk and inflation on the term structure of interest rates.

Following Chen *et al* (2005) and Hordahl and tristani (2007), we are considering the inflation, liquidity risk, default risk as the main forces affecting the term structure of interest rates in Jordan, but with considering the default risk = 0 on treasury bills and treasury bonds based on the fact that the bonds in Jordan are not defaulted.

Multiple regression analysis is used in this study to examine the relationship between the term structure of interest rates and the independent variables.

$$TS_{it} = \alpha_0 + \alpha_1 DEF_{it} + \alpha_2 INF + \alpha_3 LIQ + \varepsilon \quad (1)$$

In this study three ordinary least square (OLS) models were used as a multi-variate test to investigate the effect of each independent variable on the term structure of interest rates:

$$JIBOR_{it} = \alpha_0 + \alpha_1 DEF_{it} + \alpha_2 INF_{it} + \alpha_3 [VTB_{it} + NTB_{it} + CP_{it}] + \varepsilon \quad (2)$$

$$T.Bills_{it} = \alpha_0 + \alpha_1 DEF_{it} + \alpha_2 INF_{it} + \alpha_3 [VTB_{it} + NTB_{it} + CP_{it}] + \varepsilon \quad (3)$$

$$T.Bonds_{it} = \alpha_0 + \alpha_1 DEF_{it} + \alpha_2 INF_{it} + \alpha_3 [VTB_{it} + NTB_{it} + CP_{it}] + \varepsilon \quad (4)$$

Where:

JIBOR: Weighted Average Interest Rates on Interbank

DEF: Default Risk Premium

INF: Inflation Rate

VTB: Volume of Traded Bonds

NTB: Number of Traded Bonds

CP: Closing Price

T.Bill: Weighted Average Interest Rate on Treasury Bills

T.Bond: Weighted Average Interest Rate on Treasury Bonds

ε: Error Term

Chapter Five

Estimation Results and Analysis

5-1 Introduction

This chapter aims to analyze the estimation results of empirical models used in the current study to accomplish the study objective.

Therefore, it presents the results of descriptive statistics of the variables used in the study, as well as, the estimation results of empirical model using pooled data analysis which can be estimated using multiple regression analysis.

5-2 Descriptive Statistics

This section presents the most important descriptive statistics of all variables used in our study such as mean and standard deviation, the results of descriptive statistics are reported in table (5-1).

Table (5-1): Descriptive Statistics of key variables of the Study

Variable	Mean	Std. Deviation	Min.	Max.
Default Risk Premium on JIBORS	.90	.562	0	2
Default Risk Premium on Treasury Bills	.00	.000	0	0
Default Risk Premium on Treasury Bonds	.00	.000	0	0
Inflation Rate	4.42	3.705	-1	14
Value of Traded Bonds (JD)	3612000.64	3886338.755	0	11376928
No. of Traded Bonds	12731.27	24490.207	0	72258
Closing Price	1250.38	987.140	157	3324
JIBORS	3.70	1.419	2	6

Weighted Average Interest Rate on Treasury Bills	2.81	1.569	1	5
Weighted Average Interest Rrate on Treasury Bonds	6.29	1.262	4	8

The results presented in table (5-1) show that default risk premium on (JIBOR) has an average of 0.90 during the period of the study with 0.562 standard deviation, inflation has an average of 4.42 and standard deviation of 3.70, value of traded bonds (JD) has an average of 3612000.64 and a standard deviation of 3886338.755, number of traded bonds average is 12731.27 and standard deviation is 24490.207 during the period of the study, closing price has an average of 1250.38 and a standard deviation of 987.140, JIBORS has an average of 3.70 and a standard deviation of 1.419 during the period of the study, weighted average interest rate on treasury bills has an average of 2.81 and a standard deviation of 1.569, weighted average interest rate on treasury bonds has an average of 6.29 during the period of the study and a standard deviation of 1.26.

5-3 Regression Results and Hypothesis Testing

Hypothesis One: To test the first hypothesis, which states that "there is a statistical relationship between (JIBOR) and (Default Risk Premium, Inflation Rate, liquidity risk), a multiple regression test is used.

To make sure that the imposition of a lack of high correlation between the independent variables (Liquidity Risk, Default Risk and Inflation), we are using the linear correlation test (Multicollinearity), based on Variance Inflation Factor (VIF) and test variability allowed tolerance for each variable which should not exceed the inflation coefficient value (10) and Tolerance should be greater than (0.05). We show through analysis that all of this did not exceed the limit. This underlines the lack of a high correlation between the independent variables (Liquidity Risk, Default Risk and Inflation) on the dependent variable (JIBOR).

Table (5-2) Test of Multicolinirity between each Default risk, Liquidity Risk and Inflation for variable by using VIF& Tolerance

JIBOR	VIF	Tolerance
Default Risk	1.502	.666
Inflation	1.655	.604
Liquidity	1.383	.723

Table (5-2) shows the results of the statistical analysis of the data on the factors that affect the weighted average interest rate on loans between banks for one night (JIBOR) during the period (2002-2012).

And we used (R Square) to see the ability independent factors combined to explain the changes that occur in the dependent variable we use contrast interpreter (the weighted average interest rate on loans between banks for one night JIBORS). Table (5-3) shows it.

Table (5-3) the Effect of Variation for Default Risk, Liquidity Risk, and Inflation on JIBOR

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.656[a]	.430	.145	1.370

Evident from the data presented in Table (5-3) shows that the variation (R Square) was 43% , which means that all independent factors combined have a positive impact on the weighted average interest rate on loans between banks for one night (JIBOR), and that these factors explain that amount of (43%) almost from the changes that occur in the dependent variable the weighted average interest rate on loans between banks for one night (JIBOR), the presence of (67%) of the changes that occur in the weighted average interest rate on loans between banks for one night (JIBOR) occur as a result of other non-specific variables.

Through the use of software (SPSS), and keeping the definition of variables and according to the methodology of the study, the statistics contained in the table are as follows: representing the regression coefficient, and the values of "t", and "F" calculated, and notes from the table that form are statistically significant at the level of (5%).

Table (5-4) Multiple Regression Results: The Impact of Liquidity Risk, Default Risk, and Inflation on JIBOR during the period (2002-2012)

Independent variable	βi	T-Value	Sig.
DEF on JIBORS	2.041	1.344	.227
INF	.250	1.663	.147
Liquidity	-8.79	-.642	.545
F-Value	1.508		
Sig.	0.305		

Evident from the data presented in Table (5-4) as follow:

- There is no statistically significant relationship at the level of (5%) between the Default risk and JIBOR.

- There is no statistically significant relationship at the level of (5%) between Inflation factor and JIBOR.

- There is no statistically significant relationship at the level of (5%) between Liquidity risk and JIBOR.

- It also refers to the results of the regression analysis that there is no statistically significant relationship at the level of (5%) of default risk on JIBOR, Inflation , and Liquidity on (JIBOR) , where the change in these factors do not affect the interest rates on loans between banks for one night (JIBOR).

Based on the above:

1. Reject the hypothesis, which states that "there is a statistically significant relationship between the weighted average interest rate on loans between banks for one night (JIBOR), and Default Risk on JIBOR", where there is no statistically significant relationship at the level of (5%).

2. Reject the hypothesis, which states that "there is a statistically significant relationship between the weighted average interest rate on loans between banks for one night (JIBORS), and the inflation rate", where there is no statistically significant relationship at the level of (5%).

3. Reject the hypothesis, which states that "there is a statistically significant relationship between the weighted average interest rate on loans between banks for one night (JIBOR) and liquidity risk" where there are no statistically significant relationship at the level of (5%).

Hypothesis Two: To test the second hypothesis, which states that "there is a statistical relationship between (T.Bill) and (Default Risk Premium, Liquidity risk Premium, and Inflation Rate), multiple regression test has been used.

To make sure that the imposition of a lack of high correlation between the independent variables (Default Risk Premium, Liquidity risk Premium, and Inflation Rate), we are using the linear correlation test

(Multicollinearity), based on Variance Inflation Factor (VIF) and test variability allowed Tolerance for each variable which should not exceed the inflation coefficient value (10) and Tolerance should be greater than (0.05). We show through analysis that all of this did not exceed the limit. This underlines the lack of a high correlation between the independent variables (Default Risk Premium, Liquidity risk Premium, and Inflation Rate) and the dependent variable (T.Bill).

Table (5-5) test of Multicolinirity for Liquidity risk, Default Risk, and Inflation on the Weighted Average Interest Rates on Treasury Bills by using VIF& Tolerance

Variable	VIF	Tolerance
Inflation	.751	1.332
Liquidity	.751	1.332

Table (5-5) shows the results of the statistical analysis of data on the factors that affect the Weighted Average Interest Rate on Treasury Bills during the period (2002-2012).

And we used (R Square) to see how the independent ability factors combined to explain the changes that occur in the dependent variable was the use of contrast interpreter (Weighted Average Interest Rate on Treasury Bills), Table (5-6) shows it.

Table (5-6) the Effect of variation for Liquidity Risk, Default Risk, and Inflation on the Weighted Average Interest Rates on Treasury Bills

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.639[a]	.409	.240	1.317

Evident from the data presented in Table (5-7) shows that the variation (R Square) was (0.409), which means that all independent factors combined have a positive impact on the (Weighted Average Interest Rate on Treasury Bills), and that these factors explains an amount of (41%) from the changes that occur in the dependent variable (Weighted Average Interest Rate on Treasury Bills), the results shows that (59%) of the changes that occur in the (Weighted Average Interest Rate on Treasury Bills) occur as a result of other non-specific variables.

Through the use of software (SPSS), and keeping the definition of variables and according to the methodology of the study, the statistics contained in the table are as follows: representing the regression coefficient, and the values of "t", and "F" calculated, and notes from the table that form are statistically significant at the level of (5%).

Table (5-7) Multiple Regression Results: The Impact of Liquidity Risk, Default Risk, and Inflation on Weighted Average Interest Rates on Treasury Bills during the period (2002-2012)

Independent variable	βi	T-Value	Sig.
INF	.205	1.577	.159
Liquidity	-6.992	-.541	.605
F-Value	2.418		
Sig.	.159		

Evident from the data presented in Table (5-7) as follows:

- There is no statistically significant relationship at the level of (5%) between Inflation factor and (T.Bill), where it reached the level of significance (0.159).

- There is no statistically significant relationship at the level of (5%) between the liquidity and (T.Bill), where it reached the level of significance (0.605).

- It also refers to the results of the regression analysis that there is no statistically significant relationship at the level of (5%) between each of: (Default Risk, Liquidity Risk, and Inflation) and (T.Bill), where the change in these factors do not affect the Weighted Average Interest Rate on Treasury Bills.

Based on the above:

1. Reject the hypothesis, which states that "there is a statistically significant differences between the Weighted Average Interest Rate on

Treasury Bills (T.Bill) , and the inflation rate (INF)", where there is no relationship statistically significant at the level of (5%).

2. Rejected the hypothesis, which states that "there is a statistically significant differences between the Weighted Average Interest Rate on Treasury Bills (T.Bill) and liquidity risk (LIQ)" where there is no relationship statistically significant at the level of (5%).

Hypothesis three: To test the third hypothesis, which states that "there is a statistical relationship between (T.Bond) and (Default Risk, Inflation Rate, Liquidity risk)", has been used multiple regression test.

To make sure that the imposition of a lack of high correlation between the independent variables (Default Risk , Inflation Rate, Liquidity risk), we are using the linear correlation test (Multicolinirity), based on Variance Inflation Factor (VIF) and test variability allowed Tolerance for each variable which should not exceed the inflation coefficient value (10) and Tolerance should be greater than (0.05). We show through analysis that all of this did not exceed the limit. This underlines the lack of a high correlation between the independent variables (Default Risk, Inflation Rate, Liquidity risk) on the dependent variable (T.Bond).

Table (5-8) test of Multicolinirity Between each of Default Risk, Liquidity Risk and Inflation on the Weighted Average Interest Rates on Treasury Bonds using VIF& Tolerance

Variable	VIF	Tolerance
INF	.751	1.332
Liquidity	.751	1.332

Table (5-8) shows the results of the statistical analysis of data on the factors that affect the Weighted Average Interest Rate on Treasury Bonds during the period (2002-2012).

And we used (R Square) to see how the independent ability factors combined to explain the changes that occur in the dependent variable was the use of contrast interpreter (Weighted Average Interest Rate on Treasury Bonds), Table (5-9) shows it.

Table (5-9) the Effect of Variation for Liquidity Risk, Default Risk, and Inflation on the Weighted Average Interest Rates on Treasury Bonds

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
3	.568	.322	.129	1.194

Evident from the data presented in Table (5-9) that the variation (R Square) was (0.322), which means that all independent factors combined have a positive impact on the (Weighted Average Interest Rate on Treasury Bonds), and that these factors explain an amount of (32%) from the changes that occur in the dependent variable (Weighted Average

Interest Rate on Treasury Bonds), the presence of (68%) shows that the changes that occur in the Weighted Average Interest Rate on Treasury Bonds occur as a result of other non-specific variables.

Through the use of software (SPSS), and keeping the definition of variables and according to the methodology of the study, the statistics contained in the table are as follows: representing the regression coefficient, and the values of "t", and "F" calculated, and notes from the table that form are statistically significant at level of (5%).

Table (5-10) Multiple Regression Results: the Impact of Default Risk, Liquidity Risk, and Inflation on the Weighted Average Interest Rates on Bond during the Period (2002-2012)

Independent variable	βi	T-Value	Sig.
INF	.153	1.304	.234
Liquidity	-5.33	-.455	.663
F-Value	1.665		
Sig.	.256		

Evident from the data presented in Table (5-10) as follows:

- There is no statistically significant relationship at the level of (5%) between Inflation factor and (T.Bond), where it reached the level of significance of (0.234).

- There is no statistically significant relationship at the level of (5%) between Liquidity and (T.Bond), where it reached the level of significance (0.663).

- It also refers to the results of the regression analysis that there is no statistically significant relationship at the level of (5%) between each of: (Default Risk , Inflation Rate, Liquidity risk) and (T.Bond), where the change in these factors do not affect the middle Prairie interest rates on the Weighted Average Interest Rate on Treasury Bonds.

Based on the above:

1. Reject the hypothesis, which states that "there is a statistically significant relationship between the Weighted Average Interest Rate on Treasury Bonds (T.Bond), and the inflation rate (INF)", where there is no relationship statistically significant at the level of (5%).

2. Rejected the hypothesis, which states that "there is a statistically significant relationship between the Weighted Average Interest Rate on Treasury Bonds (T.Bond) and liquidity ratio (LIQ)" where there is no relationship statistically significant at the level of (5%).

Chapter Six

Conclusion and Recommendation

6-1 Introduction

This chapter summarizes the main findings of the study and provides the conclusion by analyzing the results, in addition we present our recommendations and limitations of the study.

6-2 Summary of the Research Results

The aim of this study is to examine the default risk, liquidity risk, and inflation on the term structure of interest rates expressed by treasury bonds, treasury bills, and JIBOR. The sample covers the time period from 2002 to 2012.

In the light of the findings of the study analysis results can be summarized as follows:

1- Results of the descriptive statistics analysis shows that the JIBOR, the weighted average interest rates on treasury bills, and the weighted average interest rates on treasury bonds, are respectively (3.7%), (2.81%), (6.29%) showing that the treasury bonds have the highest mean value in the term structure of interest rates in Jordan.

2- Liquidity risk, default risk, and inflation have no significant effect on the term structure of interest rates in Jordan.

3- The relationship between liquidity risk and the term structure of interest rates appears to be negative because in the short run the liquidity factor can affect the term structure of interest rates via risk premia, in the period when cyclical trend locates below (or above) its long-run equilibrium value, unity, the risk premium of the asset tends to increase (or decrease), meaning that investor who invest in a bond for a specify period would not like to go beyond that period to take full advantage of the liquidity premium because the liquidity premium after a specified date starts to be negligible.

4- The relationship between the term structure and default risk shows to be negative, because the bonds market in Jordan is owned by the government that guarantees the bonds which makes the defaulting chances appear to be impossible.

5- The relationship between inflation and the term structure of interest rates reveals negativity, because in the case of deficit it becomes a source of inflation if they are accommodated by monetary policy- that is, if the government responds to higher deficits by increasing the growth of money. The central bank has two ways of responding to higher deficits: The central bank directly purchases the securities issued by the government to finance the deficits. The private sector

purchases these same securities; then, the central bank attempts to limit any potential interest rate increases.

6-3 Recommendations

Based on the results of the study, we recommend the following:

1- The study recommends that decision makers must consider issuing bonds to the public as it is considered a debt instrument to help in financing deficit in Jordan and to have a real open market economy.

2- This study also recommends policy makers to increase the efficiency of the capital market.

3- The term structure and the yield curve is an extremely important element in Finance. It is the most important element for pricing contingent claims, determining the cost of capital and managing financial risk, so it must have the attention it needs as the most important source of future implications about interest rates.

4- Because there is a scarcity of the studies in Jordan and in the developing countries in the field of the term structure of interest rates, more research must be conducted to the term structure of interest rates.

6-4 Limitations

At the end this study has some limitations, the most important difficulties faced by the researcher in collecting and analyzing the data as follows:

1- The bonds market in Jordan is limited and shallow and issuing bonds is limited to institutions which makes having the data about bonds market difficult.

2- The system used in recording transactions was manual until 2002 which makes getting the data before 2002 hard to get, which force us to eliminate the data sample from 2000-2012 to 2002-2012.

3- Finally, the lack of high-quality databases has formed a major barrier on constructing research on the term structure of interest rates, using such data base would help examining additional variables that could determine the term structure of interest rates.

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Appendix (1): Data on Treasury Bills

CF_ISSUE_NAME	SELLING_PRICE_BASE	SELLING_PRICE	DENO_VALUE	MATURITY_DATE	ISSUE_DATE	BERS_ISSUE_NUM
الاصدار الاول من اذونات الخزينة الاردنية لعام 2002	100	98.049	100,000,000.00	08/04/2002	02/03/2002	01 01 0002201 0001
الاصدار الثاني من اذونات الخزينه الاردنيه لعام2002	100	98.062	100,000,000.00	28-08-2002	28-02-2002	01 01 0002202 0001
الاصدار الثالث من أذونات الخزينة الاردنية لعام 2002	100	98.031	100,000,000.00	20-11-2002	20-05-2002	01 01 0200203 0001
الاصدار الرابع من اذونات الخزينة الاردنية لعام 2002	100	98.367	100,000,000.00	02/04/2003	08/04/2002	01 01 2002004 0001
الاصدار الخامس من أذونات الخزينة الاردنية لعام 2002	100	98.371	100,000,000.00	27-02-2003	28-08-2002	01 01 2002005 0001
الاصدار السادس من اذونات الخزينة الاردنية لعام 2002	100	99.175	100,000,000.00	29-12-2002	29-09-2002	01 01 2002006 0001
الاصدار السابع من اذونات الخزينة الاردنية لعام 2002	100	98.387	100,000,000.00	20-05-2003	20-11-2002	01 01 2002007 0001
الاصدار الثامن من اذونات الخزينة الاردنية لعام 2002	100	98.473	100,000,000.00	06/02/2003	12/02/2002	01 01 2002008 0001
الاصدار التاسع من أذونات الخزينة الاردنية لعام 2002	100	99.271	100,000,000.00	30-03-2003	29-12-2002	01 01 2002009 0001
الاصدار الاول من أذونات الخزينة الاردنية لعام 2003	100	98.587	100,000,000.00	08/04/2003	02/04/2003	01 01 2003001 0001
الاصدار الثاني من اذونات الخزينة الاردنية لعام 2003	100	98.62	100,000,000.00	27-08-2003	27-02-2003	01 01 2003002 0001
الاصدار الثالث من أذونات الخزينة لعام 2003	100	98.612	100,000,000.00	30-09-2003	30-03-2003	01 01 2003003 0001
الاصدار الرابع من أذونات الخزينة 2003	100	98.884	100,000,000.00	02/04/2004	08/04/2003	01 01 2003004 0001
الاصدار الخامس من أذونات الخزينة لعام 2003	100	98.892	100,000,000.00	26-02-2004	27-08-2003	01 01 2003005 0001
الاصدار السادس من اذونات الخزينة لعام 2003	100	98.907	100,000,000.00	29-02-2004	31-08-2003	01 01 2003006 0001
الاصدار السابع من اذونات الخزينة لعام 2003	100	98.911	100,000,000.00	30-03-2004	30-09-2003	01 01 2003007 0001
الاصدار الثامن من اذونات الخزينة الاردنية لعام 2003	100	98.972	100,000,000.00	30-06-2004	30-12-2003	01 01 2003008 0001
الاصدار الاول من أذونات الخزينة الاردنية لعام 2004	100	98.97	100,000,000.00	08/05/2004	02/05/2004	01 01 2004001 0001
الاصدار الثاني من أذونات الخزينة الاردنية لعام 2004	100	98.956	200,000,000.00	29-08-2004	29-02-2004	01 01 2004002 0001
الاصدار الثالث من اذونات الخزينة لعام 2004	100	98.927	100,000,000.00	30-09-2004	30-03-2004	01 01 2004003 0001
الاصدار الرابع من اذونات الخزينة لعام 2004	100	98.67	100,000,000.00	02/05/2005	08/05/2004	01 01 2004004 0001
الاصدار الخامس من أذونات الخزينة لعام 2004	100	98.707	100,000,000.00	27-02-2005	29-08-2004	01 01 2004005 0001
الأصدار السادس من أذونات الخزينة لعام 2004	100	98.71	100,000,000.00	30-03-2005	30-09-2004	01 01 2004006 0001
الأصدار السابع من أذونات الخزينة لعام 2004	100	98.736	100,000,000.00	29-05-2005	29-11-2004	01 01 2004007 0001
الأصدار الثامن من أذونات الخزينة لعام 2004	100	98.444	100,000,000.00	29-06-2005	29-12-2004	01 01 2004008 0001
الاصدار التاسع من أذونات الخزينة لعام 2004	100	98.223	100,000,000.00	30-06-2005	30-12-2004	01 01 2004009 0001
الاصدار الاول من اذونات الخزينة الاردنية لعام 2005	100	98.245	100,000,000.00	27-08-2005	27-02-2005	01 01 2005001 0001
الاصدار الثاني من اذونات الخزينة الاردنية لعام 2005	100	97.949	100,000,000.00	29-11-2005	29-05-2005	01 01 2005002 0001
الاصدار الثالث من اذونات الخزينة الاردنية لعام 2005	100	97.87	100,000,000.00	30-11-2005	31-05-2005	01 01 2005003 0001
الاصدار الرابع من اذونات الخزينة الاردنية لعام 2005	100	97.72	200,000,000.00	29-12-2005	30-06-2005	01 01 2005004 0001
الاصدار الخامس من أذونات الخزينة الاردنية لعام 2005	100	97.411	100,000,000.00	28-02-2006	28-08-2005	01 01 2005005 0001
الاصدار السادس من أذونات الخزينة الأردنية لعام 2005	100	97.284	100,000,000.00	19-03-2006	19-09-2005	01 01 2005006 0001
الاصدار السابع من أذونات الخزينة الأردنية لعام 2005	100	96.751	100,000,000.00	16-05-2006	16-11-2005	01 01 2005007 0001
الاصدار الثامن من أذونات الخزينة الأردنية لعام 2005	100	93.157	100,000,000.00	30-11-2006	30-11-2005	01 01 2005008 0001
الاصدار التاسع من أذونات الخزينة الأردنية لعام 2005	100	97.413	100,000,000.00	16-05-2006	15-12-2005	01 01 2005009 0001
الاصدار العاشر من ا\ونات الخزينة الاردنية لعام 2005	100	94.006	100,000,000.00	30-11-2006	29-12-2005	01 01 2005010 0001
الاصدار الاول من اذونات الخزينة الاردنية لعام 2006	100	93.419	50,000,000.00	15-01-2007	15-01-2006	01 01 2006001 0001
الاصدار الثاني من اذونات الخزينة الاردنية لعام 2006	100	94.041	50,000,000.00	15-01-2007	19-02-2006	01 01 2006002 0001
الاصدار الثالث من اذونات الخزينة الاردنية لعام 2006	100	93.29	50,000,000.00	17-04-2007	17-04-2006	01 01 2006003 0001
الاصدار الرابع من اذونات الخزينة الاردنية لعام 2006	100	93.803	50,000,000.00	17-04-2007	15-05-2006	01 01 2006004 0001
الاصدار الخامس من اذونات الخزينة الاردنية لعام 2006	100	94.362	50,000,000.00	17-04-2007	15-06-2006	01 01 2006005 0001
الاصدار السادس من اذونات الخزينة الاردنية لعام 2006	100	98.362	50,000,000.00	17-10-2006	17-07-2006	01 01 2006006 0001
الاصدار السابع من اذونات الخزينة الاردنية لعام 2006	100	96.63	50,000,000.00	31-01-2007	31-07-2006	01 01 2006007 0001
الاصدار الثامن من اذونات الخزينة الاردنية لعام 2006	100	96.605	50,000,000.00	15-02-2007	15-08-2006	01 01 2006008 0001

الاصدار التاسع من اذونات الخزينة الاردنية لعام 2006	100	93.408	50,000,000.00	17-09-2007	17-09-2006	01 01 2006009 0001
الاصدار العاشر من أذونات الخزينة الاردنية لعام 2006	100	94.042	50,000,000.00	17-09-2007	17-10-2006	01 01 2006010 0001
الاصدار الحادي عشر من اذونات الخزينة الاردنية لعام 2006	100	94.557	50,000,000.00	17-09-2007	15-11-2006	01 01 2006011 0001
الاصدار الثاني عشر من أذونات الخزينة الاردنية لعام 2006	100	93.532	50,000,000.00	17-12-2007	17-12-2006	01 01 2006012 0001
الاصدار الاول من اذونات الخزينة الاردنية لعام 2007	100	93.442	50,000,000.00	15-02-2008	15-02-2007	01 01 2007001 0001
الاصدار الثاني من أذونات الخزينة الاردنية لعام 2007	100	94.191	50,000,000.00	15-02-2008	25-03-2007	01 01 2007002 0001
الاصدار الثالث من أذونات الخزينة الاردنية لعام 2007	100	94.701	50,000,000.00	15-02-2008	15-04-2007	01 01 2007003 0001
الاصدار الرابع من أذونات الخزينة الأردنية لعام 2007	100	93.572	50,000,000.00	20-05-2008	20-05-2007	01 01 2007004 0001
الاصدار الخامس من أذونات الخزينة الاردنية لعام 2007	100	94.27	50,000,000.00	20-05-2008	24-06-2007	01 01 2007005 0001
الاصدار السادس من أذونات الخزينة الأردنية لعام 2007	100	94.604	50,000,000.00	20-05-2008	15-07-2007	01 01 2007006 0001
الاصدار السابع من أذونات الخزينة الأردنية لعام 2007	100	93.659	50,000,000.00	19-08-2008	19-08-2007	01 01 2007007 0001
الاصدار الثامن من أذونات الخزينة الأردنية لعام 2007	100	94.195	50,000,000.00	19-08-2008	17-09-2007	01 01 2007008 0001
الإصدار التاسع من أذونات الخزينة الأردنية لعام 2007	100	95.063	50,000,000.00	19-08-2008	21-10-2007	01 01 2007009 0001
الإصدار العاشر من أذونات الخزينة لعام 2007	100	94.163	50,000,000.00	18-11-2008	18-11-2007	01 01 2007010 0001
الاصدار الحادي عشر من اذونات الخزينة الاردنية لعام 2007	100	98.594	100,000,000.00	24-03-2008	24-12-2007	01 01 2007011 0001
الاصدار الثاني عشر من اذونات الخزينة الاردنية لعام 2007	100	98.58	200,000,000.00	30-03-2008	30-12-2007	01 01 2007012 0001
الاصدار الاول من أذونات الخزينة الأردنيه لعام 2008	100	94.454	100,000,000.00	29-01-2009	29-01-2008	01 01 2008001 0001
الاصدار الثاني من أذونات الخزينة الاردنيه لعام 2008	100	94.607	100,000,000.00	25-02-2009	25-02-2008	01 01 2008002 0001
الإصدار الثالث من أذونات الخزينة الأردنية لعام 2008	100	94.59	100,000,000.00	27-03-2009	27-03-2008	01 01 2008003 0001
الإصدار الرابع من أذونات الخزينة الأردنية لعام 2008	100	94.38	100,000,000.00	14-04-2009	14-04-2008	01 01 2008004 0001
الاصدار الخامس من أذونات الخزينة الاردنية لعام 2008	100	94.22	100,000,000.00	28-04-2009	28-04-2008	01 01 2008005 0001
الإصدار السادس من أذونات الخزينة الأردنية لعام 2008	100	94.113	100,000,000.00	15-05-2009	15-05-2008	01 01 2008006 0001
الاصدار الثامن من أذونات الخزينة الأردنية لعام 2008	100	98.604	150,000,000.00	28-08-2008	28-05-2008	01 01 2008008 0001
الإصدار التاسع من أذونات الخزينة الأردنية لعام 2008	100	98.597	100,000,000.00	26-11-2008	26-08-2008	01 01 2008009 0001
الاصدار العاشر من أذونات الخزينة الأردنية لعام 2008	100	93.312	75,000,000.00	10/05/2009	10/05/2008	01 01 2008010 0001
الاصدار الحادي عشر من أذونات الخزينة الأردنية لعام 2008	100	93.287	100,000,000.00	20-10-2009	20-10-2008	01 01 2008011 0001
الاصدار الثاني عشر من أذونات الخزينة الأردنية لعام 2008	100	93.032	50,000,000.00	26-10-2009	26-10-2008	01 01 2008012 0001
الاصدار الثالث عشر من أذونات الخزينة الأردنية لعام 2008	100	96.949	50,000,000.00	28-04-2009	28-10-2008	01 01 2008013 0001
الإصدار الرابع عشر من أذونات الخزينة الأردنية لعام 2008	100	96.861	36,000,000.00	05/05/2009	11/05/2008	01 01 2008014 0001
الاصدار الخامس عشر من أذونات الخزينة الاردنية لعام 2008	100	96.855	50,000,000.00	05/12/2009	11/12/2008	01 01 2008015 0001
الإصدار السادس عشر من أذونات الخزينة الأردنية لعام 2008	100	96.884	55,000,000.00	18-05-2009	18-11-2008	01 01 2008016 0001
الإصدار السابع عشر من أذونات الخزينة الأردنية لعام 2008	100	96.922	150,000,000.00	24-05-2009	24-11-2008	01 01 2008017 0001
الإصدار الثامن عشر من أذونات الخزينة الأردنية لعام 2008	100	97.272	100,000,000.00	21-06-2009	21-12-2008	01 01 2008018 0001
الاصدار الاول من أذونات الخزينة الادنية لعام 2009	100	97.934	75,000,000.00	22-08-2009	22-02-2009	01 01 2009001 0001
الاصدار الثالث من أذونات الخزينة الاردنية لعام 2009	100	97.984	75,000,000.00	09/05/2009	03/05/2009	01 01 2009003 0001
الإصدار الرابع من أذونات الخزينة الأردنية لعام 2009	100	98.235	100,000,000.00	19-09-2009	19-03-2009	01 01 2009004 0001
الإصدار الخامس من أذونات الخزينة الأردنية لعام 2009	100	98.266	118,000,000.00	29-09-2009	29-03-2009	01 01 2009005 0001
الاصدار السادس من أذونات الخزينة الأردنية لعام 2009	100	98.535	50,000,000.00	22-10-2009	22-04-2009	01 01 2009006 0001
الاصدار السابع من أذونات الخزينة الاردنية لعام 2009	100	98.558	100,000,000.00	28-10-2009	28-04-2009	01 01 2009007 0001
الإصدار الثامن من أذونات الخزينة الأردنية لعام 2009	100	98.576	100,000,000.00	18-11-2009	18-05-2009	01 01 2009008 0001
الإصدار التاسع من أذونات الخزينة الأردنية لعام 2009	100	98.584	100,000,000.00	25-11-2009	25-05-2009	01 01 2009009 0001
الاصدار العاشر من اذونات الخزينة الاردنية لعام 2009	100	98.614	50,000,000.00	12/11/2009	06/11/2009	01 01 2009010 0001
الإصدار الحادي عشر من أذونات الخزينة الاردنية لعام 2009	100	98.602	50,000,000.00	14-12-2009	14-06-2009	01 01 2009011 0001
الإصدار الثاني عشر من أذونات الخزينة الاردنية لعام 2009	100	98.611	100,000,000.00	17-12-2009	17-06-2009	01 01 2009012 0001
الإصدار الثالث عشر من أذونات الخزينة الأردنية لعام 2009	100	98.599	100,000,000.00	21-12-2009	21-06-2009	01 01 2009013 0001
الاصدار الرابع عشر من أذونات الخزينة الاردنية لعام 2009	100	96.297	50,000,000.00	07/09/2010	07/09/2009	01 01 2009014 0001
الإصدار الخامس عشر من أذونات الخزينة الاردنية لعام 2009	100	98.539	50,000,000.00	23-01-2010	23-07-2009	01 01 2009015 0001

الاصدار السادس عشر من اذونات الخزينة الاردنية لعام 2009	100	98.508	50,000,000.00	30-01-2010	30-07-2009	01 01 2009016 0001
الإصدار السابع عشر من اذونات الخزينة الاردنية لعام 2009	100	98.496	50,000,000.00	02/06/2010	08/06/2009	01 01 2009017 0001
الإصدار الثامن عشر من أذونات الخزينة الأردنية لعام 2009	100	98.482	100,000,000.00	20-02-2010	20-08-2009	01 01 2009018 0001
الإصدار التاسع عشر من أذونات الخزينة الأردنية لعام 2009	100	98.419	100,000,000.00	26-02-2010	26-08-2009	01 01 2009019 0001
الإصدار العشرون من أذونات الخزينة الأردنية لعام 2009	100	96.257	72,000,000.00	31-08-2010	31-08-2009	01 01 2009020 0001
الإصدار الحادي والعشرين من أذونات الخزينة الأردنية لعام 2009	100	98.467	50,000,000.00	03/03/2010	09/03/2009	01 01 2009021 0001
الاصدار الثاني والعشرين من أذونات الخزينة الاردنية لعام 2009	100	98.441	100,000,000.00	03/10/2010	09/10/2009	01 01 2009022 0001
الاصدار الثالث والعشرين من أذونات الخزينة الاردنية لعام 2009	100	98.419	75,000,000.00	15-03-2010	15-09-2009	01 01 2009023 0001
الاصدار الرابع والعشرين من أذونات الخزينة الاردنية لعام 2009	100	96.269	28,000,000.00	17-09-2010	17-09-2009	01 01 2009024 0001
الإصدار الخامس والعشرون من أذونات الخزينة الاردنية لعام 2009	100	98.416	100,000,000.00	29-03-2010	29-09-2009	01 01 2009025 0001
الاصدار السادس والعشرين من أذونات الخزينة الاردنية لعام 2009	100	98.43	50,000,000.00	04/01/2010	10/01/2009	01 01 2009026 0001
الإصدار السابع والعشرين من أذونات الخزينة الأردنية لعام 2009	100	98.411	50,000,000.00	04/08/2010	10/08/2009	01 01 2009027 0001
الإصدار الثامن والعشرون من أذونات الخزينة الاردنية لعام 2009	100	98.402	100,000,000.00	15-04-2010	15-10-2009	01 01 2009028 0001
الاصدار التاسع والعشرين من أذونات الخزينة الاردنية لعام 2009	100	98.391	50,000,000.00	19-04-2010	19-10-2009	01 01 2009029 0001
الإصدار الثلاثين من أذونات الخزينة الاردنية لعام 2009	100	98.383	50,000,000.00	20-04-2010	20-10-2009	01 01 2009030 0001
الاصدار الحادي والثلاثين من أذونات الخزينة الاردنية لعام 2009	100	98.355	75,000,000.00	21-04-2010	21-10-2009	01 01 2009031 0001
الإصدار الثاني والثلاثون من أذونات الخزينة لعام 2009	100	98.363	41,000,000.00	22-04-2010	22-10-2009	01 01 2009032 0001
الاصدار الثالث والثلاثين من أذونات الخزينة الاردنية لعام 2009	100	98.338	50,000,000.00	26-04-2010	26-10-2009	01 01 2009033 0001
الإصدار الرابع والثلاثين من أذونات الخزينة الأردنية لعام 2009	100	98.336	50,000,000.00	28-04-2010	28-10-2009	01 01 2009034 0001
الاصدار الخامس والثلاثين من أذونات الخزينة الاردنية لعام 2009	100	98.344	50,000,000.00	05/05/2010	11/05/2009	01 01 2009035 0001
الاصدار السادس والثلاثين من أذونات الخزينة الاردنية لعام 2009	100	98.351	100,000,000.00	18-05-2010	18-11-2009	01 01 2009036 0001
الاصدار السابع والثلاثين من أذونات الخزينة الاردنية لعام 2009	100	96.349	50,000,000.00	22-11-2010	22-11-2009	01 01 2009037 0001
الاصدار الثامن والثلاثين من أذونات الخزينة الاردنية لعام 2009	100	96.358	100,000,000.00	25-11-2010	25-11-2009	01 01 2009038 0001
الإصدار التاسع والثلاثين من اذونات الخزينة الاردنية لعام 2009	100	98.608	100,000,000.00	23-06-2010	23-12-2009	01 01 2009039 0001
الإصدار الأول من أذونات الخزينة الأردنية لعام 2010	100	98.684	50,000,000.00	08/11/2010	02/11/2010	01 01 2010001 0001
الإصدار الثاني من أذونات الخزينة الاردنية لعام 2010	100	98.941	50,000,000.00	09/11/2010	03/11/2010	01 01 2010002 0001
الاصدار الثالث من أذونات الخزينة الأردنية لعام 2010	100	98.955	50,000,000.00	15-09-2010	15-03-2010	01 01 2010003 0001
الإصدار الرابع من اذونات الخزينة الاردنية لعام 2010	100	98.964	50,000,000.00	10/08/2010	04/08/2010	01 01 2010004 0001
الإصدار الخامس من أذونات الخزينة الأردنية لعام 2010	100	98.949	50,000,000.00	13-10-2010	13-04-2010	01 01 2010005 0001
الإصدار السادس من أذونات الخزينة الأردنية لعام 2010	100	98.867	50,000,000.00	22-10-2010	22-04-2010	01 01 2010006 0001
الإصدار السابع من أذونات الخزينة الاردنية لعام 2010	100	98.857	50,000,000.00	28-10-2010	28-04-2010	01 01 2010007 0001
الإصدار الثامن من أذونات الخزينة الأردنية لعام 2010	100	97.121	48,000,000.00	05/04/2011	05/04/2010	01 01 2010008 0001
الإصدار التاسع من أذونات الخزينة الأردنية لعام 2010	100	98.816	50,000,000.00	13-11-2010	13-05-2010	01 01 2010009 0001
الإصدار العاشر من أذونات الخزينة لعام 2010	100	98.778	72,000,000.00	18-11-2010	18-05-2010	01 01 2010010 0001
الإصدار الحادي عشر من أذونات الخزينة الأردنية لعام 2010	100	98.737	50,000,000.00	23-11-2010	23-05-2010	01 01 2010011 0001
الاصدار الثاني عشر من أذونات الخزينة لعام 2010	100	98.69	50,000,000.00	30-11-2010	30-05-2010	01 01 2010012 0001
الإصدار الخامس عشر من أذونات الخزينة الأردنية لعام 2010	100	98.612	50,000,000.00	20-12-2010	20-06-2010	01 01 2010015 0001
الإصدار الثامن عشر من أذونات الخزينة الأردنية لعام 2010	100	98.585	50,000,000.00	20-01-2011	20-07-2010	01 01 2010018 0001
الاصدار التاسع عشر من أذونات الخزينة الاردنية لعام 2010	100	98.575	50,000,000.00	26-01-2011	26-07-2010	01 01 2010019 0001
الاصدار العشرين من أذونات الخزينة الاردنية لعام 2010	100	98.581	52,500,000.00	02/01/2011	08/01/2010	01 01 2010020 0001
الإصدار الحادي والعشرين من أذونات الخزينة الأردنية لعام 2010	100	98.591	50,000,000.00	16-02-2011	16-08-2010	01 01 2010021 0001
الاصدار الثاني والعشرين من أذونات الخزينة الأردنية لعام 2010	100	98.602	50,000,000.00	24-02-2011	24-08-2010	01 01 2010022 0001
الإصدار الثالث والعشرين من أذونات الخزينة الأردنية لعام 2010	100	98.649	50,000,000.00	28-02-2011	31-08-2010	01 01 2010023 0001
الإصدار الرابع والعشرين من أذونات الخزينة الأردنية لعام 2010	100	98.685	50,000,000.00	03/05/2011	09/05/2010	01 01 2010024 0001
الاصدار الخامس والعشرين من أذونات الخزينة الاردنية لعام 2010	100	98.748	100,000,000.00	13-03-2011	13-09-2010	01 01 2010025 0001
الإصدار السادس والعشرين من أذونات الخزينة الاردنية لعام 2010	100	97.005	100,000,000.00	21-09-2011	21-09-2010	01 01 2010026 0001
الإصدار السابع والعشرين من أذونات الخزينة الأردنية لعام 2010	100	98.822	50,000,000.00	04/05/2011	10/05/2010	01 01 2010027 0001

الاصدار الثامن والعشرين من اذونات الخزينة الاردنية لعام2010	100	98.842	50,000,000.00	14-04-2011	14-10-2010	01 01 2010028 0001
الاصدار التاسع والعشرين من أذونات الخزينة الاردنية لعام 2010	100	98.844	50,000,000.00	24-04-2011	24-10-2010	01 01 2010029 0001
الإصدار الثلاثين من أذونات الخزينة الاردنية لعام 2010	100	98.845	77,000,000.00	28-04-2011	28-10-2010	01 01 2010030 0001
الاصدار الحادي والثلاثين من أذونات الخزينة الاردنية لعام 2010	100	98.864	50,000,000.00	05/04/2011	11/04/2010	01 01 2010031 0001
الاصدار الثالث والثلاثين من أذونات الخزينة الاردنية لعام 2010	100	98.883	50,000,000.00	06/09/2011	12/09/2010	01 01 2010033 0001
الاصدار الرابع والثلاثين من أذونات الخزينة الاردنية 2010	100	98.878	100,000,000.00	23-06-2011	23-12-2010	01 01 2010034 0001
الاصدار الخامس والثلاثين من أذونات الخزينة الاردنية لعام 2010	100	98.876	50,000,000.00	27-06-2011	27-12-2010	01 01 2010035 0001
الإصدار الأول من أذونات الخزينة الأردنية لعام 2011	100	98.915	50,000,000.00	31-07-2011	31-01-2011	01 01 2011001 0001
الاصدار الثاني من أذونات الخزينة الاردنية لعام 2011	100	97.197	40,000,000.00	02/10/2012	02/10/2011	01 01 2011002 0001
الاصدار الثالث من أذونات الخزينة الاردنية لعام 2011	100	98.89	50,000,000.00	17-08-2011	17-02-2011	01 01 2011003 0001
الاصدار الرابع من أذونات الخزينة الاردنية لعام 2011	100	98.795	100,000,000.00	23-08-2011	23-02-2011	01 01 2011004 0001
الاصدار الخامس من اذونات الخزينة الاردنية لعام 2011	100	96.651	100,000,000.00	28-02-2012	28-02-2011	01 01 2011005 0001
الاصدار السادس من أذونات الخزينة الاردنية لعام 2011	100	98.628	75,000,000.00	09/07/2011	03/07/2011	01 01 2011006 0001
الاصدار السابع من أذونات الخزينة الاردنية لعام 2011	100	96.422	35,000,000.00	03/10/2012	03/10/2011	01 01 2011007 0001
الإصدار الثامن من أذونات الخزينة الاردنية لعام 2011	100	96.261	75,000,000.00	17-03-2012	17-03-2011	01 01 2011008 0001
الاصدار التاسع من أذونات الخزينة الاردنية لعام 2011	100	98.566	65,500,000.00	21-09-2011	21-03-2011	01 01 2011009 0001
الاصدار العاشر من أذونات الخزينة الاردنية لعام 2011	100	98.527	43,000,000.00	29-09-2011	29-03-2011	01 01 2011010 0001
الاصدار الحادي عشر من أذونات الخزينة الاردنية لعام 2011	100	96.249	37,000,000.00	31-03-2012	31-03-2011	01 01 2011011 0001
الاصدار الثاني عشر من أذونات الخزينه الاردنيه لعام 2011	100	98.506	67,500,000.00	10/05/2011	04/05/2011	01 01 2011012 0001
الاصدار الثالث عشر من أذونات الخزينه الاردنيه لعام 2011	100	96.146	56,000,000.00	18-04-2012	18-04-2011	01 01 2011013 0001
الإصدار الرابع عشر من أذونات الخزينة الأردنية لعام2011	100	96.007	14,000,000.00	05/05/2012	05/05/2011	01 01 2011014 0001
الإصدار الخامس عشر من أذونات الخزينة الأردنية لعام 2011	100	98.415	50,000,000.00	14-12-2011	14-06-2011	01 01 2011015 0001
الاصدار السادس عشر من أذونات الخزينه الاردنيه لعام 2011	100	98.404	50,000,000.00	16-12-2011	16-06-2011	01 01 2011016 0001
الإصدار السابع عشر من أذونات الخزينة الأردنية لعام 2011	100	98.318	75,000,000.00	03/07/2012	09/07/2011	01 01 2011017 0001
الاصدار الثامن عشر من أذونات الخزينه الأردنيه لعام 2011	100	96.16	50,000,000.00	25-09-2012	25-09-2011	01 01 2011018 0001
الإصدار التاسع عشر من أذونات الخزينة الأردنية لعام 2011	100	98.446	50,000,000.00	30-04-2012	30-10-2011	01 01 2011019 0001
الاصدار العشرين من أذونات الخزينة الأردنيه لعام 2011	100	98.518	50,000,000.00	14-05-2012	14-11-2011	01 01 2011020 0001
الاصدار الحادي والعشرين من أذونات الخزينه الأردنيه لعام 2011	100	96.352	100,000,000.00	20-11-2012	20-11-2011	01 01 2011021 0001
الاصدار الثاني والعشرين من أذونات الخزينه الأردنيه لعام 2011	100	98.504	81,000,000.00	27-05-2012	27-11-2011	01 01 2011022 0001
الإصدار الثالث والعشرين من أذونات الخزينة الاردنية لعام 2011	100	98.491	50,000,000.00	28-05-2012	28-11-2011	01 01 2011023 0001
الاصدار الرابع والعشرين من أذونات الخزينه الأردنيه لعام 2011	100	98.446	50,000,000.00	06/04/2012	12/04/2011	01 01 2011024 0001
الإصدار السادس والعشرين من أذونات الخزينة الأردنية لعام 2011	100	99.332	100,000,000.00	03/07/2012	12/07/2011	01 01 2011026 0001
الإصدار السابع والعشرين من أذونات الخزينة الأردنية لعام 2011	100	98.406	50,000,000.00	06/08/2012	12/08/2011	01 01 2011027 0001
الاصدار الثامن والعشرين من أذونات الخزينه الاردنيه لعام 2011	100	99.296	50,000,000.00	03/12/2012	12/12/2011	01 01 2011028 0001
الاصدار التاسع والعشرين من أذونات الخزينه الأردنيه لعام 2011	100	99.283	50,000,000.00	14-03-2012	14-12-2011	01 01 2011029 0001
الإصدار الأول من أذونات الخزينة الأردنية لعام 2012	100	98.317	50,000,000.00	23-07-2012	23-01-2012	01 01 2012001 0001
الإصدار الثاني من أذونات الخزينة الاردنية لعام 2012	100	98.146	50,000,000.00	14-08-2012	14-02-2012	01 01 2012002 0001
الاصدار الثالث من أذونات الخزينة الاردنيه لعام 2012	100	96.965	75,000,000.00	22-11-2012	22-02-2012	01 01 2012003 0001
الاصدار الرابع من أذونات الخزينة الاردنيه لعام 2012	100	96.923	75,000,000.00	29-11-2012	29-02-2012	01 01 2012004 0001
الاصدار الخامس من أذونات الخزينة الاردنيه لعام 2012	100	96.873	75,000,000.00	12/04/2012	03/04/2012	01 01 2012005 0001
الإصدار السادس من أذونات الخزينة الأردنية لعام 2012	100	95.54	75,000,000.00	03/07/2013	03/07/2012	01 01 2012006 0001
الإصدار السابع من أذونات الخزينة الأردنية لعام 2012	100	95.561	150,000,000.00	18-03-2013	18-03-2012	01 01 2012007 0001
الإصدار الثامن من أذونات الخزينة الأردنية لعام 2012	100	95.449	100,000,000.00	28-03-2013	28-03-2012	01 01 2012008 0001
الإصدار التاسع من أذونات الخزينة الأردنية لعام 2012	100	95.352	50,000,000.00	04/10/2013	04/10/2012	01 01 2012009 0001
الإصدار العاشر من أذونات الخزينة الأردنية لعام 2012	100	95.074	75,000,000.00	24-05-2013	24-05-2012	01 01 2012010 0001
الاصدار الحادي عشر من أذونات الخزينه الاردنيه لعام 2012	100	94.656	75,000,000.00	07/08/2013	07/08/2012	01 01 2012011 0001
الإصدار الثاني عشر من أذونات الخزينة الأردنية لعام 2012	100	94.562	75,000,000.00	15-07-2013	15-07-2012	01 01 2012012 0001

الاصدار الثالث عشر من أذونات الخزينة الاردنيه لعام 2012	100	94.485	75,000,000.00	13-08-2013	13-08-2012	01 01 2012013 0001
الاصدار الرابع عشر من أذونات الخزينة الأردنيه لعام 2012	100	94.394	50,000,000.00	27-08-2013	27-08-2012	01 01 2012014 0001
الاصدار الخامس عشر من أذونات الخزينه الأردنيه لعام 2012	100	94.305	50,000,000.00	09/10/2013	09/10/2012	01 01 2012015 0001
الإصدار السادس عشر من أذونات الخزينة الأردنية لعام 2012	100	94.2	50,000,000.00	20-09-2013	20-09-2012	01 01 2012016 0001
الإصدار السابع عشر من أذونات الخزينة الأردنية لعام 2012	100	94.183	50,000,000.00	26-09-2013	26-09-2012	01 01 2012017 0001
الاصدار الثامن عشر من أذونات الخزينة الأردنيه لعام 2012	100	94.18	50,000,000.00	10/08/2013	10/08/2012	01 01 2012018 0001
الإصدار التاسع عشر من أذونات الخزينة الأردنية لعام 2012	100	94.18	75,000,000.00	18-11-2013	18-11-2012	01 01 2012019 0001
الإصدار العشرين من أذونات الخزينة الأردنية لعام 2012	100	94.18	70,000,000.00	22-11-2013	22-11-2012	01 01 2012020 0001
الإصدار الحادي والعشرين من أذونات الخزينة الأردنية لعام 2012	100	93.541	50,000,000.00	12/04/2013	12/04/2012	01 01 2012021 0001
الإصدار الثاني والعشرين من أذونات الخزينة الأردنية لعام 2012	100	93.677	60,000,000.00	20-12-2013	20-12-2012	01 01 2012022 0001

Appendix (2): Data on Treasury Bonds

CF_ISSUE_NAME	DENO_VALUE	ANNUAL_INTEREST_RATE	MATURITY_DATE	ISSUE_DATE	BERS_ISSUE_NUM
الاصدار الاول من سندات الخزينة الاردنية لعام 2002	100,000,000.00	5.25	29-12-2007	29-12-2002	01 02 2002001 0001
الاصدار الاول من سندات الخزينة الاردنية لعام 2003	100,000,000.00	4.85	20-03-2008	20-03-2003	01 02 2003001 0001
الاصدار الثاني من سندات الخزينة الاردنية لعام 2003	200,000,000.00	4.25	30-06-2008	30-06-2003	01 02 2003002 0001
الاصدار الثالث من سندات الخزينة الاردنية لعام 2003	100,000,000.00	4.5	30-09-2008	30-09-2003	01 02 2003003 0001
الاصدار الرابع من سندات الخزينة الاردنية لعام 2003	100,000,000.00	4.49	30-11-2008	30-11-2003	01 02 2003004 0001
الاصدار الخامس من سندات الخزينة الاردنية لعام 2003	100,000,000.00	4.58	28-12-2008	28-12-2003	01 02 2003005 0001
الأصدار الأول من سندات الخزينة الأردنية لعام 2004	100,000,000.00	5.47	06/06/2009	06/06/2004	01 02 2004001 0001
الأصدار الثاني من سندات الخزينة الأردنية لعام 2004	100,000,000.00	7.05	18-08-2011	18-08-2004	01 02 2004002 0001
الاصدار الاول من سندات الخزينة الاردنية لعام 2005	100,000,000.00	6.22	18-05-2010	18-05-2005	01 02 2005001 0001
الإصدار الثاني من سندات الخزينة الأردنية لعام 2005	100,000,000.00	7.01	07/10/2010	07/10/2005	01 02 2005002 0001
الاصدار الثالث من سندات الخزينة الاردنية لعام 2005	100,000,000.00	7.22	22-08-2010	22-08-2005	01 02 2005003 0001
الاصدار الرابع من سندات الخزينة الاردنية لعام 2005	100,000,000.00	7.3	15-09-2010	15-09-2005	01 02 2005004 0001
الاصدار الخامس من سندات الخزينة الأردنية لعام 2005	100,000,000.00	8.82	17-10-2010	17-10-2005	01 02 2005005 0001
الاصدار الاول من سندات الخزينة الاردنية لعام 2006	50,000,000.00	7.26	29-01-2009	29-01-2006	01 02 2006001 0001
الاصدار الثاني من سندات الخزينة الاردنية لعام 2006	50,000,000.00	7.7	28-02-2011	28-02-2006	01 02 2006002 0001
الاصدار الثالث من سندات الخزينة الاردنية لعام 2006	50,000,000.00	7.39	29-01-2009	30-03-2006	01 02 2006003 0001
الاصدار الخامس من سندات الخزينة الاردنية لعام 2006	50,000,000.00	8.03	28-02-2011	05/07/2006	01 02 2006005 0001
الاصدار السابع من سندات الخزينة الاردنية لعام 2006	50,000,000.00	7.83	29-01-2009	06/11/2006	01 02 2006007 0001
الاصدار الثامن من سندات الخزينة الاردنية لعام 2006	50,000,000.00	8.36	28-02-2011	29-06-2006	01 02 2006008 0001
الاصدار التاسع من سندات الخزينة الاردنية لعام 2006	50,000,000.00	7.741	31-08-2009	31-08-2006	01 02 2006009 0001
الاصدار العاشر من سندات الخزينة الاردنية لعام 2006	50,000,000.00	8.152	28-09-2011	28-09-2006	01 02 2006010 0001
الاصدار الحادي عشر من سندات الخزينة الاردنية لعام 2006	50,000,000.00	7.498	31-08-2009	31-10-2006	01 02 2006011 0001
الاصدار الثاني عشر من سندات الخزينة الاردنية لعام 2006	50,000,000.00	8.034	28-09-2011	30-11-2006	01 02 2006012 0001
الاصدار الثالث عشر من سندات الخزينة الاردنية لعام 2006	50,000,000.00	7.658	31-08-2009	28-12-2006	01 02 2006013 0001
الاصدار الأول من سندات الخزينة الأردنية لعام 2007	50,000,000.00	7.8	30-04-2012	30-04-2007	01 02 2007001 0001
الاصدار الثاني من سندات الخزينة الاردنية لعام 2007	50,000,000.00	7.514	31-05-2010	31-05-2007	01 02 2007002 0001
الاصدار الثالث من سندات الخزينة الأردنية لعام 2007	50,000,000.00	7.864	30-04-2012	28-06-2007	01 02 2007003 0001
الاصدار الرابع من سندات الخزينة الأردنية لعام 2007	50,000,000.00	7.954	30-07-2012	30-07-2007	01 02 2007004 0001
الاصدار الخامس من سندات الخزينة الأردنية لعام 2007	50,000,000.00	7.431	30-08-2010	30-08-2007	01 02 2007005 0001
الاصدار السابع من سندات الخزينة الأردنية لعام 2007	50,000,000.00	7.875	30-09-2012	30-09-2007	01 02 2007007 0001
الاصدار الثامن من سندات الخزينة الأردنية لعام 2007	50,000,000.00	7.139	28-10-2010	28-10-2007	01 02 2007008 0001
الاصدار التاسع من سندات الخزينة الاردنية لعام 2007	100,000,000.00	7.155	29-11-2010	29-11-2007	01 02 2007009 0001
الإصدار العاشر من سندات الخزينة الأردنية لعام 2007	92,500,000.00	7.296	16-12-2010	16-12-2007	01 02 2007010 0001
الإصدار الأول من سندات الخزينة الاردنية لعام 2008	100,000,000.00	7.738	14-02-2013	14-02-2008	01 02 2008001 0001
الإصدار الثاني من سندات الخزينة الأردنية لعام 2008	148,000,000.00	7.395	23-03-2011	23-03-2008	01 02 2008002 0001
الاصدار الثالث من سندات الخزينة الاردنية لعام 2008	114,200,000.00	7.91	31-03-2011	31-03-2008	01 02 2008003 0001
الإصدار الخامس من سندات الخزينة الأردنية لعام 2008	103,000,000.00	7.962	20-05-2010	20-05-2008	01 02 2008005 0001
الإصدار السادس من سندات الخزينة الأردنية لعام 2008	40,000,000.00	7.391	15-12-2009	15-06-2008	01 02 2008006 0001
الإصدار السابع من سندات الخزينة الأردنية لعام 2008	100,000,000.00	7.58	26-12-2009	26-06-2008	01 02 2008007 0001
الإصدار الثامن من سندات الخزينة الأردنية لعام 2008	60,000,000.00	7.644	30-12-2009	30-06-2008	01 02 2008008 0001
الإصدار التاسع من سندات الخزينة الأردنية لعام 2008	100,000,000.00	7.062	19-08-2009	19-08-2008	01 02 2008009 0001

الإصدار العاشر من سندات الخزينة الأردنية لعام 2008	100,000,000.00	7.145	24-08-2009	24-08-2008	01 02 2008010 0001
الإصدار الحادي عشر من سندات الخزينة الأردنية لعام 2008	100,000,000.00	7.663	28-02-2010	28-08-2008	01 02 2008011 0001
الاصدار الثاني عشر من سندات الخزينة الأردنية لعام 2008	150,000,000.00	8.09	22-09-2010	22-09-2008	01 02 2008012 0001
الاصدار الثالث عشر من سندات الخزينة الاردنية لعام 2008	100,000,000.00	7.336	26-05-2010	26-11-2008	01 02 2008013 0001
الاصدار الرابع عشر من سندات الخزينة الاردنية لعام 2008	50,000,000.00	7.221	14-12-2010	14-12-2008	01 02 2008014 0001
الإصدار الخامس عشر من سندات الخزينة الأردنية لعام 2008	100,000,000.00	6.908	24-12-2010	24-12-2008	01 02 2008015 0001
الاصدار الاول من سندات الخزينة الاردنية لعام 2009	50,000,000.00	6.562	01/08/2011	01/08/2009	01 02 2009001 0001
الإصدار الثاني من سندات الخزينة الأردنية لعام 2009	50,000,000.00	6.747	15-01-2012	15-01-2009	01 02 2009002 0001
الاصدار الثالث من سندات الخزينة الاردنية لعام 2009	50,000,000.00	6.588	22-01-2012	22-01-2009	01 02 2009003 0001
الإصدار الرابع من سندات الخزينة الأردنية لعام 2009	125,000,000.00	6.361	29-01-2012	29-01-2009	01 02 2009004 0001
الإصدار الخامس من سندات الخزينة الأردنية لعام 2009	75,000,000.00	6.855	25-02-2014	25-02-2009	01 02 2009005 0001
الإصدار السادس من سندات الخزينة الاردنية لعام 2009	70,000,000.00	5.27	26-03-2012	26-03-2009	01 02 2009006 0001
الإصدار السابع من سندات الخزينة الأردنية لعام 2009	50,000,000.00	5.293	04/02/2012	04/02/2009	01 02 2009007 0001
الاصدار الثامن من سندات الخزينة الاردنيه لعام 2009	50,000,000.00	6.013	04/09/2014	04/09/2009	01 02 2009008 0001
الإصدار التاسع من سندات الخزينة الأردنية لعام 2009	50,000,000.00	5.2	16-04-2012	16-04-2009	01 02 2009009 0001
الإصدار العاشر من سندات الخزينة الأردنية لعام 2009	50,000,000.00	4.697	23-04-2012	23-04-2009	01 02 2009010 0001
الإصدار الحادي عشر من سندات الخزينة الاردنية لعام 2009	50,000,000.00	5.726	05/05/2014	05/05/2009	01 02 2009011 0001
الاصدار الثاني عشر من سندات الخزينة الاردنية لعام 2009	100,000,000.00	4.795	05/12/2012	05/12/2009	01 02 2009012 0001
الإصدار الثالث عشر من سندات الخزينة الأردنية لعام 2009	100,000,000.00	4.828	20-05-2012	20-05-2009	01 02 2009013 0001
الإصدار الرابع عشر من سندات الخزينة الأردنية لعام 2009	34,000,000.00	4.801	06/04/2012	06/04/2009	01 02 2009014 0001
الاصدار الخامس عشر من سندات الخزينة الاردنية لعام 2009	50,000,000.00	5.037	25-06-2012	25-06-2009	01 02 2009015 0001
الإصدار السادس عشر من سندات الخزينة الاردنية لعام 2009	50,000,000.00	5.263	07/02/2012	07/02/2009	01 02 2009016 0001
الإصدار السابع عشر من سندات الخزينة الاردنية لعام 2009	50,000,000.00	5.378	16-07-2012	16-07-2009	01 02 2009017 0001
الاصدار الثامن عشر من سندات الخزينة الاردنية لعام 2009	50,000,000.00	5.287	13-08-2012	13-08-2009	01 02 2009018 0001
الإصدار التاسع عشر من سندات الخزينة الاردنية لعام 2009	100,000,000.00	5.488	24-08-2012	24-08-2009	01 02 2009019 0001
الإصدار العشرون من سندات الخزينة الأردنية لعام 2009	50,000,000.00	5.728	09/08/2012	09/08/2009	01 02 2009020 0001
الإصدار الحادي والعشرين من سندات الخزينة الأردنية لعام 2009	50,000,000.00	5.592	12/03/2012	12/03/2009	01 02 2009021 0001
الإصدار الثاني والعشرين من سندات الخزينة الأردنية لعام 2009	50,000,000.00	5.505	13-12-2012	13-12-2009	01 02 2009022 0001
الإصدار الثالث والعشرين من سندات الخزينة الأردنية لعام 2009	50,000,000.00	5.408	17-12-2012	17-12-2009	01 02 2009023 0001
الإصدار الرابع والعشرين من سندات الخزينة الأردنية لعام 2009	50,000,000.00	5.004	21-12-2012	21-12-2009	01 02 2009024 0001
الاصدار الخامس والعشرين من سندات الخزينة الاردنية لعام 2009	100,000,000.00	4.988	27-12-2012	27-12-2009	01 02 2009025 0001
الاصدار السادس والعشرين من سندات الخزينة الاردنية لعام 2009	100,000,000.00	5.01	30-12-2012	30-12-2009	01 02 2009026 0001
الإصدار الأول من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.966	21-01-2013	21-01-2010	01 02 2010001 0001
الإصدار الثاني من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.956	25-01-2013	25-01-2010	01 02 2010002 0001
الإصدار الثالث من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.861	02/04/2013	02/04/2010	01 02 2010003 0001
الإصدار الرابع من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.778	21-02-2013	21-02-2010	01 02 2010004 0001
الإصدار الخامس من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.252	24-02-2013	24-02-2010	01 02 2010005 0001
الإصدار السادس من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.196	28-02-2013	28-02-2010	01 02 2010006 0001
الإصدار السابع من سندات الخزينة الأردنية لعام 2010	50,000,000.00	5.091	03/03/2015	03/03/2010	01 02 2010007 0001
الإصدار الثامن من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.124	03/07/2013	03/07/2010	01 02 2010008 0001
الإصدار التاسع من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.1	03/09/2013	03/09/2010	01 02 2010009 0001
الإصدار العاشر من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.035	18-03-2013	18-03-2010	01 02 2010010 0001
الإصدار الحادي عشر من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.063	22-03-2013	22-03-2010	01 02 2010011 0001
الإصدار الثاني عشر من سندات الخزينة الأردنية لعام 2010	50,000,000.00	5.171	04/01/2015	04/01/2010	01 02 2010012 0001

الإصدار الثالث عشر من سندات الخزينة الاردنية لعام 2010	47,000,000.00	4.16	04/04/2013	04/04/2010	01 02 2010013 0001
الإصدار الرابع عشر من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.164	04/06/2013	04/06/2010	01 02 2010014 0001
الإصدار الخامس عشر من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.243	04/11/2013	04/11/2010	01 02 2010015 0001
الإصدار السادس عشر من سندات الخزينة لعام 2010	100,000,000.00	3.103	15-10-2011	15-04-2010	01 02 2010016 0001
الإصدار السابع عشر من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.657	19-04-2013	19-04-2010	01 02 2010017 0001
الإصدار الثامن عشر من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.115	21-04-2012	21-04-2010	01 02 2010018 0001
الإصدار التاسع عشر من سندات الخزينة الأردنية لعام 2010	20,000,000.00	4.19	26-04-2012	26-04-2010	01 02 2010019 0001
الإصدار العشرين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	3.356	11/02/2011	05/02/2010	01 02 2010020 0001
الإصدار الحادي والعشرين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.261	05/06/2012	05/06/2010	01 02 2010021 0001
الإصدار الثاني والعشرين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	3.651	11/11/2011	05/11/2010	01 02 2010022 0001
الإصدار الثالث والعشرين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	3.887	16-11-2011	16-05-2010	01 02 2010023 0001
الإصدر الرابع والعشرين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.005	20-11-2011	20-05-2010	01 02 2010024 0001
الإصدار الخامس والعشرين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.063	26-11-2011	26-05-2010	01 02 2010025 0001
الاصدار السادس والعشرين من سندات الخزينة لعام 2010	50,000,000.00	4.4	30-11-2011	31-05-2010	01 02 2010026 0001
الإصدار السابع والعشرين من سندات الخزينة الأردنية لعام 2010	40,800,000.00	4.622	15-12-2011	15-06-2010	01 02 2010027 0001
الاصدار الثامن والعشرين من سندات الخزينه الاردنيه لعام 2010	50,000,000.00	4.889	22-12-2011	22-06-2010	01 02 2010028 0001
الإصدار الثلاثون من سندات الخزينة الأردنية لعام 2010	41,500,000.00	4.75	24-06-2012	24-06-2010	01 02 2010030 0001
الاصدار الحادي والثلاثين من سندات الخزينة الاردنية لعام 2010	35,000,000.00	4.844	07/01/2012	07/01/2010	01 02 2010031 0001
الإصدار الثاني والثلاثين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.801	01/08/2012	07/08/2010	01 02 2010032 0001
الاصدار الثالث والثلاثين من سندات الخزينة لعام 2010	50,000,000.00	4.938	13-07-2012	13-07-2010	01 02 2010033 0001
الاصدار الرابع والثلاثين من سندات الخزينة الاردنية لعام 2010	42,700,000.00	4.981	15-07-2012	15-07-2010	01 02 2010034 0001
الاصدار الخامس الثلاثين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.987	22-07-2012	22-07-2010	01 02 2010035 0001
الاصدار السادس و الثلاثين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.951	08/08/2012	08/08/2010	01 02 2010036 0001
الإصدار السابع والثلاثين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.884	19-08-2012	19-08-2010	01 02 2010037 0001
الإصدار الثامن والثلاثين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.859	26-08-2012	26-08-2010	01 02 2010038 0001
الإصدار التاسع والثلاثين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.35	03/02/2012	09/02/2010	01 02 2010039 0001
الإصدار الأربعين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.626	09/07/2012	09/07/2010	01 02 2010040 0001
الاصدار الحادي والاربعين من سندات الخزينه الاردنية لعام 2010	50,000,000.00	5.047	09/08/2013	09/08/2010	01 02 2010041 0001
الإصدار الثاني والأربعين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	5.887	15-09-2015	15-09-2010	01 02 2010042 0001
الاصدار الثالث والاربعين من سندات الخزينة الاردنية لعام 2010	75,700,000.00	4.984	19-09-2013	19-09-2010	01 02 2010043 0001
الإصدار الرابع والأربعين من سندات الخزينة الأردنية لعام 2010	100,000,000.00	3.532	22-03-2012	22-09-2010	01 02 2010044 0001
الإصدار الخامس والأربعين من سندات الخزينة الاردنية لعام 2010	37,100,000.00	5.813	27-09-2015	27-09-2010	01 02 2010045 0001
الإصدار السابع والأربعين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.855	10/07/2013	10/07/2010	01 02 2010047 0001
الاصدار الثامن والاربعين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.217	10/12/2012	10/12/2010	01 02 2010048 0001
الاصدار التاسع والاربعين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.716	19-10-2013	19-10-2010	01 02 2010049 0001
الاصدار الخمسين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	5.749	21-10-2015	21-10-2010	01 02 2010050 0001
الاصدار الحادي والخمسين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.705	26-10-2013	26-10-2010	01 02 2010051 0001
الإصدار الثاني والخمسين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.674	11/02/2013	11/02/2010	01 02 2010052 0001
الاصدار الثالث والخمسين من سندات الخزينة الاردنية لعام 2010	50,000,000.00	4.104	11/07/2012	11/07/2010	01 02 2010053 0001
الاصدار الرابع والخمسين من سندات الخزينة الاردنية لعام2010	50,000,000.00	4.406	13-12-2013	13-12-2010	01 02 2010054 0001
الإصدار الخامس والخمسين من سندات الخزينة الأردنية لعام 2010	50,000,000.00	4.389	16-12-2013	16-12-2010	01 02 2010055 0001
الاصدار السادس والخمسين من سندات الخزينة الاردنية لعام 2010	76,600,000.00	4.394	20-12-2013	20-12-2010	01 02 2010056 0001

الاصدار الاول من سندات الخزينة الاردنية لعام 2011	24,000,000.00	4.357	01/11/2014	01/11/2011	01 02 2011001 0001
الاصدار الثاني من سندات الخزينة الاردنية لعام 2011	21,000,000.00	4.369	16-01-2014	16-01-2011	01 02 2011002 0001
الاصدار الثالث من سندات الخزينة الاردنية لعام 2011	31,000,000.00	4.355	20-01-2014	20-01-2011	01 02 2011003 0001
الإصدار الرابع من سندات الخزينة الأردنية لعام 2011	39,000,000.00	4.354	25-01-2014	25-01-2011	01 02 2011004 0001
الإصدار الخامس من سندات الخزينة الاردنية لعام 2011	42,100,000.00	4.346	02/03/2014	02/03/2011	01 02 2011005 0001
الاصدار السادس من سندات الخزينة الاردنية لعام 2011	50,000,000.00	3.937	02/08/2013	02/08/2011	01 02 2011006 0001
الاصدار الثامن من سندات الخزينة الاردنية لعام 2011	75,000,000.00	4.211	20-02-2013	20-02-2011	01 02 2011008 0001
الاصدار التاسع من سندات الخزينة الاردنية لعام 2011	50,000,000.00	4.532	27-02-2013	27-02-2011	01 02 2011009 0001
الاصدار الحادي عشر من سندات الخزينة الاردنية لعام 2011	72,500,000.00	4.691	03/08/2013	03/08/2011	01 02 2011011 0001
الاصدار الثاني عشر من سندات الخزينة الاردنية لعام 2011	62,500,000.00	4.883	15-03-2013	15-03-2011	01 02 2011012 0001
الاصدار الثالث عشر من سندات الخزينة الاردنية لعام 2011	69,500,000.00	4.96	23-03-2013	23-03-2011	01 02 2011013 0001
الاصدار الرابع عشر من سندات الخزينة الاردنية لعام 2011	21,000,000.00	5.331	27-03-2014	27-03-2011	01 02 2011014 0001
الإصدار الخامس عشر من سندات الخزينة الأردنية لعام 2011	75,000,000.00	5.111	04/12/2013	04/12/2011	01 02 2011015 0001
الاصدار السادس عشر من سندات الخزينه الاردنيه لعام 2011	40,100,000.00	4.614	21-10-2012	21-04-2011	01 02 2011016 0001
الإصدار السابع عشر من سندات الخزينة الأردنية لعام 2011	50,000,000.00	4.733	26-10-2012	26-04-2011	01 02 2011017 0001
الاصدار الثامن عشر من سندات الخزينه الاردنيه لعام 2011	29,600,000.00	5.283	05/12/2013	05/12/2011	01 02 2011018 0001
الإصدار التاسع عشر من سندات الخزينة الأردنية لعام 2011	50,000,000.00	5.289	19-05-2013	19-05-2011	01 02 2011019 0001
الإصدار العشرين من سندات الخزينة الأردنية لعام 2011	50,000,000.00	5.263	31-05-2013	31-05-2011	01 02 2011020 0001
الاصدار الحادي والعشرين من سندات الخزينه الاردنيه لعام 2011	50,000,000.00	5.371	06/09/2013	06/09/2011	01 02 2011021 0001
الإصدار الثاني والعشرين من سندات الخزينة الأردنية لعام 2011	19,000,000.00	5.859	21-06-2014	21-06-2011	01 02 2011022 0001
الإصدار الثالث والعشرين من سندات الخزينة الأردنية لعام 2011	50,000,000.00	5.954	23-06-2014	23-06-2011	01 02 2011023 0001
الاصدار الرابع والعشرين من سندات الخزينه الاردنيه لعام 2011	50,000,000.00	6.04	27-06-2014	27-06-2011	01 02 2011024 0001
الاصدار الخامس والعشرين من سندات الخزينه الأردنيه لعام 2011	50,000,000.00	6.144	30-06-2014	30-06-2011	01 02 2011025 0001
الإصدار السادس والعشرين من سندات الخزينة الأردنية لعام 2011	39,700,000.00	7.309	07/05/2016	07/05/2011	01 02 2011026 0001
الاصدار السابع والعشرين من سندات الخزينه الأردنيه لعام 2011	50,000,000.00	6.256	07/07/2014	07/07/2011	01 02 2011027 0001
الإصدار الثامن والعشرين من سندات الخزينة الأردنية لعام 2011	25,000,000.00	5.674	14-07-2013	14-07-2011	01 02 2011028 0001
الاصدار التاسع والعشرين من سندات الخزينه الأردنيه لعام 2011	75,000,000.00	6.761	13-09-2014	13-09-2011	01 02 2011029 0001
الإصدار الثلاثين من سندات الخزينة الأردنية لعام 2011	50,000,000.00	6.588	19-09-2014	19-09-2011	01 02 2011030 0001
الإصدار الحادي والثلاثين من سندات الخزينة الأردنية لعام 2011	75,000,000.00	6.467	26-09-2014	26-09-2011	01 02 2011031 0001
الإصدار الثاني والثلاثين من سندات الخزينة الأردنية لعام 2011	46,800,000.00	6.983	10/05/2016	10/05/2011	01 02 2011032 0001
الاصدار الثالث والثلاثين من سندات الخزينة الأردنيه لعام 2011	50,000,000.00	6.389	10/09/2014	10/09/2011	01 02 2011033 0001
الإصدار الرابع والثلاثين من سندات الخزينة الأردنية لعام 2011	50,000,000.00	5.724	10/11/2013	10/11/2011	01 02 2011034 0001
الاصدار الخامس والثلاثين من سندات الخزينة الأردنية لعام 2011	50,000,000.00	6.124	16-10-2014	16-10-2011	01 02 2011035 0001
الاصدار السادس والثلاثين من سندات الخزينة الأردنيه لعام 2011	50,000,000.00	6.921	18-10-2016	18-10-2011	01 02 2011036 0001
الاصدار السابع والثلاثين من سندات الخزينة الأردنيه لعام 2011	100,000,000.00	6.181	19-10-2014	19-10-2011	01 02 2011037 0001
الإصدار الثامن والثلاثين من سندات الخزينة الأردنية لعام 2011	75,000,000.00	5.625	23-10-2013	23-10-2011	01 02 2011038 0001
الإصدار التاسع والثلاثين من سندات الخزينة الأردنية لعام 2011	75,000,000.00	6.144	25-10-2014	25-10-2011	01 02 2011039 0001
الاصدار الأربعين من سندات الخزينة الأردنيه لعام 2011	50,000,000.00	6.858	11/01/2016	11/01/2011	01 02 2011040 0001
الإصدار الحادي والأربعين من سندات الخزينة الأردنية لعام 2011	50,000,000.00	6.492	11/03/2015	11/03/2011	01 02 2011041 0001
الاصدار الثاني والاربعين من سندات الخزينه الأردنيه لعام 2011	50,000,000.00	6.475	16-11-2015	16-11-2011	01 02 2011042 0001
الإصدار الثالث والأربعين من سندات الخزينة الأردنية لعام 2011	50,000,000.00	6.156	17-11-2014	17-11-2011	01 02 2011043 0001
الاصدار الرابع والأربعين من سندات الخزينة الأردنيه لعام 2011	100,000,000.00	5.783	22-11-2013	22-11-2011	01 02 2011044 0001
الإصدار الخامس والأربعين من سندات الخزينة الأردنية	100,000,000.00	6.477	24-11-2014	24-11-2011	01 02 2011045 0001

لعام 2011					
الاصدار السادس والاربعين من سندات الخزينة الاردنيه لعام 2011	50,000,000.00	5.936	18-12-2013	18-12-2011	01 02 2011046 0001
الاصدار السابع والاربعين من سندات الخزينة الاردنيه لعام 2011	50,000,000.00	5.998	20-12-2013	20-12-2011	01 02 2011047 0001
الإصدار الثامن والأربعين من سندات الخزينة الأردنية لعام 2011	50,000,000.00	6.005	22-12-2013	22-12-2011	01 02 2011048 0001
الاصدار التاسع والاربعين من سندات الخزينه الاردنيه لعام 2011	50,000,000.00	6.025	26-12-2013	26-12-2011	01 02 2011049 0001
الإصدار الخمسين من سندات الخزينة الأردنية لعام 2011	50,000,000.00	6.081	27-12-2013	27-12-2011	01 02 2011050 0001
الإصدار الأول من سندات الخزينة الأردنية لعام 2012	50,000,000.00	6.174	01/08/2014	01/08/2012	01 02 2012001 0001
الإصدار الثاني من سندات الخزينة الأردنية لعام 2012	50,000,000.00	6.809	01/11/2015	01/11/2012	01 02 2012002 0001
الإصدار الثالث من سندات الخزينة الأردنية لعام 2012	37,500,000.00	7.246	15-01-2016	15-01-2012	01 02 2012003 0001
الاصدار الرابع من سندات الخزينة الاردنيه لعام 2012	50,000,000.00	7.489	19-01-2017	19-01-2012	01 02 2012004 0001
الاصدار الخامس من سندات الخزينة الاردنيه لعام 2012	50,000,000.00	6.114	29-01-2014	29-01-2012	01 02 2012005 0001
الاصدار السادس من سندات الخزينة الاردنيه لعام 2012	50,000,000.00	6.422	02/08/2014	02/08/2012	01 02 2012006 0001
الإصدار السابع من سندات الخزينة الأردنية لعام 2012	75,000,000.00	7.75	03/11/2017	03/11/2012	01 02 2012007 0001
الإصدار الثامن من سندات الخزينة الأردنية لعام 2012	75,000,000.00	6.402	14-03-2014	14-03-2012	01 02 2012008 0001
الاصدار التاسع من سندات الخزينة الاردنيه لعام 2012	100,000,000.00	6.372	22-03-2014	22-03-2012	01 02 2012009 0001
الاصدار العاشر من سندات الخزينة الاردنيه لعام 2012	100,000,000.00	6.375	26-03-2014	26-03-2012	01 02 2012010 0001
الاصدار الحادي عشر من سندات الخزينة الاردنيه لعام 2012	50,000,000.00	6.367	04/02/2014	04/02/2012	01 02 2012011 0001
الإصدار الثاني عشر من سندات الخزينة الأردنية لعام 2012	50,000,000.00	6.367	04/04/2014	04/04/2012	01 02 2012012 0001
الاصدار الثالث عشر من سندات الخزينة الاردنيه لعام 2012	50,000,000.00	6.384	04/08/2014	04/08/2012	01 02 2012013 0001
الاصدار الرابع عشر من سندات الخزينة الاردنيه لعام 2012	75,000,000.00	7.054	17-04-2015	17-04-2012	01 02 2012014 0001
الإصدار الخامس عشر من سندات الخزينة الأردنية لعام 2012	50,000,000.00	6.454	22-04-2014	22-04-2012	01 02 2012015 0001
الاصدار السادس عشر من سندات الخزينة الاردنيه لعام 2012	50,000,000.00	6.524	24-04-2014	24-04-2012	01 02 2012016 0001
الإصدار السابع عشر من سندات الخزينة الأردنية لعام 2012	75,000,000.00	6.597	05/01/2014	05/01/2012	01 02 2012017 0001
الاصدار الثامن عشر من سندات الخزينه الاردنيه لعام 2012	75,000,000.00	6.643	05/06/2014	05/06/2012	01 02 2012018 0001
الإصدار التاسع عشر من سندات الخزينة الأردنية لعام 2012	50,000,000.00	6.641	05/08/2014	05/08/2012	01 02 2012019 0001
الاصدار العشرين من سندات الخزينه الاردنيه لعام 2012	50,000,000.00	7.22	05/10/2015	05/10/2012	01 02 2012020 0001
الإصدار الحادي والعشرين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	6.641	14-05-2014	14-05-2012	01 02 2012021 0001
الاصدار الثاني والعشرين من سندات الخزينه الاردنيه لعام 2012	50,000,000.00	6.648	16-05-2014	16-05-2012	01 02 2012022 0001
الإصدار الثالث والعشرين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	6.648	20-05-2014	20-05-2012	01 02 2012023 0001
الاصدار الرابع والعشرين من سندات الخزينه الاردنيه لعام 2012	50,000,000.00	6.648	22-05-2014	22-05-2012	01 02 2012024 0001
الاصدار الخامس والعشرين من سندات الخزينه الاردنيه لعام 2012	75,000,000.00	6.649	28-05-2014	28-05-2012	01 02 2012025 0001
الإصدار السادس والعشرين من سندات الخزينة الأردنية لعام 2012	100,000,000.00	6.647	31-05-2014	31-05-2012	01 02 2012026 0001
الاصدار السابع والعشرين من سندات الخزينه الاردنيه لعام 2012	75,000,000.00	6.925	06/04/2014	06/04/2012	01 02 2012027 0001
الإصدار الثامن والعشرين من سندات الخزينة الأردنية لعام 2012	150,000,000.00	6.921	14-06-2014	14-06-2012	01 02 2012028 0001
الاصدار التاسع والعشرين من سندات الخزينه الاردنيه لعام 2012	150,000,000.00	7.574	19-06-2015	19-06-2012	01 02 2012029 0001
الإصدار الثلاثين من سندات الخزينة الأردنية لعام 2012	150,000,000.00	7.691	25-06-2015	25-06-2012	01 02 2012030 0001
الاصدار الحادي والثلاثين من سندات الخزينه الاردنيه لعام 2012	75,000,000.00	7.736	07/01/2015	07/01/2012	01 02 2012031 0001
الإصدار الثاني والثلاثين من سندات الخزينة الأردنية لعام 2012	75,000,000.00	7.77	07/04/2015	07/04/2012	01 02 2012032 0001
الإصدار الثالث والثلاثين من سندات الخزينة الأردنية لعام 2012	100,000,000.00	7.792	07/11/2015	07/11/2012	01 02 2012033 0001
الاصدار الرابع والثلاثين من سندات الخزينه الاردنيه لعام 2012	75,000,000.00	7.078	18-07-2014	18-07-2012	01 02 2012034 0001
الإصدار الخامس والثلاثين من سندات الخزينة الأردنية لعام 2012	75,000,000.00	7.188	22-07-2014	22-07-2012	01 02 2012035 0001
الاصدار السادس والثلاثين من سندات الخزينه الأردنيه لعام 2012	75,000,000.00	7.238	25-07-2014	25-07-2012	01 02 2012036 0001
الإصدار السابع والثلاثين من سندات الخزينة الأردنية لعام 2012	75,000,000.00	7.963	08/02/2015	08/02/2012	01 02 2012037 0001

الاصدار الثامن والثلاثين من سندات الخزينه الاردنيه لعام 2012	50,000,000.00	7.279	08/06/2014	08/06/2012	01 02 2012038 0001
الإصدار التاسع والثلاثين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.312	08/09/2014	08/09/2012	01 02 2012039 0001
الاصدار الاربعين من سندات الخزينه الاردنيه لعام 2012	50,000,000.00	7.304	15-08-2014	15-08-2012	01 02 2012040 0001
الإصدار الحادي والأربعين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.325	22-08-2014	22-08-2012	01 02 2012041 0001
الإصدار الثاني والأربعين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.387	30-08-2014	30-08-2012	01 02 2012042 0001
الإصدار الثالث والأربعين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.448	09/03/2014	09/03/2012	01 02 2012043 0001
الإصدار الرابع والأربعين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.581	09/12/2014	09/12/2012	01 02 2012044 0001
الاصدار الخامس والاربعين من سندات الخزينه الأردنيه لعام 2012	50,000,000.00	7.65	16-09-2014	16-09-2012	01 02 2012045 0001
الاصدار السادس والأربعين من سندات الخزينة الأردنيه لعام 2012	50,000,000.00	8.267	24-09-2015	24-09-2012	01 02 2012046 0001
الاصدار السابع والأربعين من سندات الخزينة الأردنيه لعام 2012	50,000,000.00	7.65	30-09-2014	30-09-2012	01 02 2012047 0001
الاصدار الثامن والاربعين من سندات الخزينة الاردنيه لعام 2012	50,000,000.00	8.298	10/04/2015	10/04/2012	01 02 2012048 0001
الإصدار التاسع والأربعين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.65	10/10/2014	10/10/2012	01 02 2012049 0001
الاصدار الخمسين من سندات الخزينة الأردنيه لعام 2012	50,000,000.00	8.299	14-10-2015	14-10-2012	01 02 2012050 0001
الإصدار الحادي والخمسين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.65	16-10-2014	16-10-2012	01 02 2012051 0001
الإصدار الثاني والخمسين من سندات الخزينة الاردنية لعام 2012	50,000,000.00	8.3	18-10-2015	18-10-2012	01 02 2012052 0001
الإصدار الثالث والخمسين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	8.3	22-10-2015	22-10-2012	01 02 2012053 0001
الإصدار الرابع والخمسين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.65	24-10-2014	24-10-2012	01 02 2012054 0001
الإصدار الخامس والخمسين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	8.3	11/04/2015	11/04/2012	01 02 2012055 0001
الاصدار السادس والخمسين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	8.3	11/06/2015	11/06/2012	01 02 2012056 0001
الإصدار السابع والخمسين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.65	11/08/2014	11/08/2012	01 02 2012057 0001
الاصدار الثامن والخمسين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	8.3	11/11/2015	11/11/2012	01 02 2012058 0001
الاصدار التاسع والخمسين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	8.3	13-11-2015	13-11-2012	01 02 2012059 0001
الاصدار الستين من سندات الخزينة الأردنية لعام 2012	75,000,000.00	8.3	20-11-2015	20-11-2012	01 02 2012060 0001
الاصدار الحادي والستين من سندات الخزينة الأردنيه لعام 2012	80,000,000.00	7.65	27-11-2014	27-11-2012	01 02 2012061 0001
الإصدار الثاني والستين من سندات الخزينة الأردنية لعام 2012	80,000,000.00	7.65	29-11-2014	29-11-2012	01 02 2012062 0001
الإصدار الثالث والستين من سندات الخزينة الأردنية لعام 2012	80,000,000.00	8.3	12/02/2015	12/02/2012	01 02 2012063 0001
الإصدار الخامس والستين من سندات الخزينة الأردنية لعام 2012	50,000,000.00	7.95	12/10/2014	12/10/2012	01 02 2012065 0001
الاصدار السادس والستين من سندات الخزينة الأردنية لعام 2012	60,000,000.00	8.6	17-12-2015	17-12-2012	01 02 2012066 0001
الاصدار السابع والستين من سندات الخزينة الأردنية لعام 2012	60,000,000.00	7.95	24-12-2014	24-12-2012	01 02 2012067 0001
الإصدار الثامن والستين من سندات الخزينة الأردنية لعام 2012	60,000,000.00	8.6	30-12-2015	30-12-2012	01 02 2012068 0001

Appendix (3): Value and Number of Traded Bonds

No. of Traded Bonds عدد السندات المتداولة	Value of Traded Bonds (JD) حجم السندات المتدولة (بالدينار)	year (السنة)
49,354	9,688,901	2002
72,258	11,376,928	2003
10,355	6,031,856	2004
3,354	3,135,705	2005
1,225	1,868,010	2006
1,580	3,799,874	2007
417	605,819	2008
761	2,529,800	2009
140	140,075	2010
600	555,039	2011
0	0	2012